TM 11-5820-494-12

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL RADIO TRANSMITTING SET AN/FRT-56

14845

HEADQUARTERS, DEPARTMENT OF THE ARMY
11 OCTOBER 1962

WARNING

Be careful when working on the 500-, 225-volt plate and power supply circuits, or on the 115-volt ac line connections.

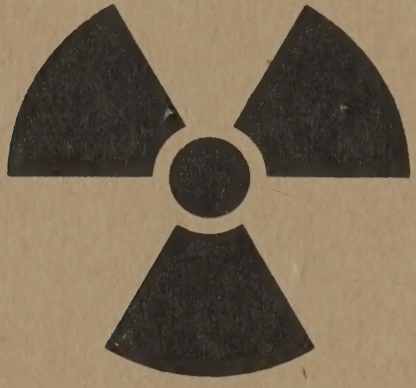
DON'T TAKE CHANCES!

EXTREMELY HIGH VOLTAGES EXIST

IN THE FOLLOWING UNITS

Pa tube V203 in the AM-2785A/URA-36 . . . 3,000 volts
Power Supply PP-2766/URA-36 . . . . . 3,000 volts
Antenna terminals . . . . . 3,000 volts

RADIATION HAZARD



Co60

Tube types OA2 and OB2 are used in this equipment and contain radioactive material (para 4). These tubes are potentially hazardous when broken; see qualified medical personnel and the Safety Director if you are exposed to or cut by broken tubes. Use extreme care in replacing these tubes and follow safe procedures in their handling, storage, and disposal (para 46*c*).

Never place radioactive tubes in your pocket.

Use extreme care not to break radioactive tubes while handling them.

Refer to paragraph 46*c* on handling, storage, and disposal of radioactive material.

Technical Manual
No. 11-5820-494-12

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D.C., *11 October 1962*

RADIO TRANSMITTING SET AN/FRT-56

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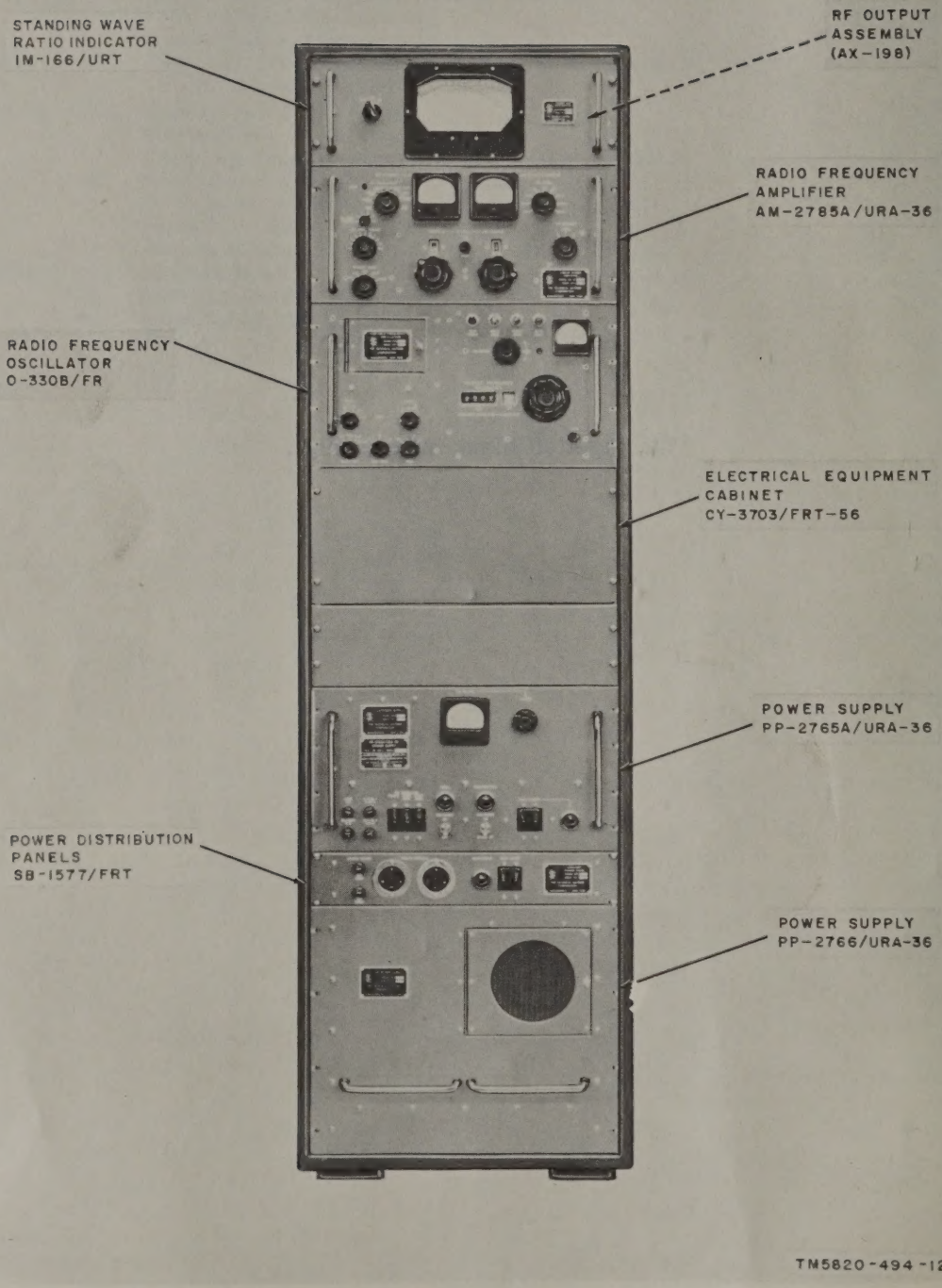


Figure 1. Radio Transmitting Set AN/FRT-56, less spare parts and manuals.

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1. Scope

This manual describes Radio Transmitting Set AN/FRT-56 (fig. 1) and covers installation procedures, operation, and first and second echelon maintenance. The manual includes instructions for cleaning and inspecting the equipment, and replacement of parts available to first and second echelon maintenance personnel.

2. Forms and Records

a. Report of Unsatisfactory Equipment. Fill out and forward DA Form 2407 (Maintenance Request) in accordance with instructions in TM 38-750 and forward it to: Commanding Officer, U. S. Army Electronics Materiel Support Agency, ATTN: SELMS-PIE, Fort Monmouth, New Jersey. The form should be filled out and forwarded to report:

(1) Receipt of defective equipment (use DD Form 6 (*b* below) if defect is due to damaged or improper shipment).
(2) Equipment deficiencies (deadlined equipments).
(3) Equipment shortcomings (operable, but at less than rated capability or efficiency).
(4) Equipment improvement suggestions and recommendations.

b. Report of Damaged or Improper Shipment. Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700-58.

c. Report of Comments on Basic Issue Items List (appx II). Fill out and forward DA Form 2028 (Recommended Changes to DA Technical Manual Parts Lists or Supply Manual 7, 8, or 9) direct to: Commanding Officer, U. S. Army Electronics Materiel Support Agency, ATTN: SELMS-ML, Fort Monmouth, New Jersey.

d. Comments on Manual. Forward all other comments on this publication direct to: Commanding Officer, U. S. Army Electronics Materiel Support Agency, SELMS-MPP-4, Fort Monmouth, New Jersey. (DA Form 1598 (Record of Comments on Publications), DA Form 2028 (*c* above), DD Form 96 (Disposition Form), or other suitable form or letter may be used.)

e. Index of Equipment Publications. Refer to DA Pamphlet 310-4 to determine what Changes to or revisions of this publication are current.

Section II. DESCRIPTION AND DATA

3. Purpose and Use

The AN/FRT-56 is a general purpose linear power amplifier and master oscillator designed for use with various types of exciter units. The AN/FRT-56 is capable of producing radiofrequency (rf) signals in the range of 2 to 32 megacycles (mc) at an approximate power output of 1 kilowatt (kw). The exact power output depends upon the additional equipment (para 7) used with the AN/FRT-56. The equipment is not capable of independent operation and is primarily intended for fixed station use with other equipment in a multiplexed communication system.

4. Technical Characteristics

Warning: **Tube types OA2 and OB2 are used in the PP-2765A/URA-36 and the O-330B/FR. These tubes contain radioactive material and are potentially hazardous when broken. The type and quantity of**

radioactivity is listed below:

Tube type	*Where used*	*Isotope*	*Quantity (micro-curies)*
OA2 and OB2	PP-2765A/URA-36	Co60	0.0067
OA2.....	O-330B/FR.....	Co60	0.0067

a. Amplifier-Power Supply Group AN/URA-36.

Note: The AN/URA-36 includes Radio Frequency Amplifier AM-2785A/URA-36, Power Supply PP-2766/URA-36, and Power Supply PP-2765A/URA-36.

Frequency range . . . . 2 to 32 mc continuous, band-switched.

Output power . . . . . 1,000-watt peak envelope power; 1,000 watts, cw or am.

Types of transmission Ssb, dsb, isb, cw, and low-level am.

Tuning . . . . . Front-panel manual controls.

Output impedance:
- Unbalanced . . . . . 50 ohms.
- Balanced . . . . . 600 ohms.

Signal to distortion ratio . . . . . At least 40 db below peak envelope power output.

Harmonic radiation:
- Second harmonic . . At least 40 db below peak envelope power output.
- All other harmonics . . . . . At least 50 db below peak envelope output.

Input requirements . . . 100 mw produces full output.

Primary power requirements . . . . . 115- or 230-volt, single-phase, 50/60 cycle ac; approximately 1,900 watts.

Number of tubes:
- AM-2785A/URA-36 . . . . . 3.
- PP-2765A/URA-36 . . . . . 8.
- PP-2766/URA-36 2.

b. Oscillator, Radio Frequency O-330B/FR.

Number of tubes . . . . 14.

Primary power requirements . . . . . 250 watts from a 115- or 230-volt, 50/50-cycle, single-phase input.

(1) *High-frequency oscillator section.*

Frequency range . . . . 2 to 64 mc (either crystal-controlled or continuously variable).

Output impedance . . . . 75 ohms.

Output level . . . . . 2 watts throughout range of 2 to 4 mc, and 0.5 watt throughout range of 4 to 64 mc.

Crystal frequencies . . 2 to 4 mc.

Output voltage waveform . . . . . Sinusoidal with no spurious frequencies.

Stability . . . . . Less than 20-cps per mc change in 0° to 50° C temperature range.

Calibration . . . . . Direct-reading calibration in cps between 2 and 4 mc. Checked against 100-kc oscillator at 50-kc checkpoints.

Dial accuracy . . . . . 20 cps per mc.

Line voltage change effects . . . . . Maximum change of 10 cps per mc for 10-percent change in line voltage.

(2) *Intermediate-frequency oscillator section.*

Frequency range . . . . 3.2 to 3.9 mc (crystal-controlled oscillator).

Output level . . . . . 2 volts across 75 ohms.

(3) *Beat-frequency oscillator section of variable frequency.*

Frequency range . . . . 300 to 1,000 kc (crystal-controlled oscillator).

Output level . . . . . 6 volts across 1,000 ohms.

c. Power Distribution Panel SB-1577/FRT.

Protective device . . . . MAIN POWER circuit breaker (for all components of the AN/FRT-56): trips at 20 amperes.

d. Standing Wave Ratio Indicator IM-166/URT.

Frequency range . . . . 2-32 mc.

Input impedance . . . . . 50 ohms.

Rating . . . . . 1,000 watts maximum with a voltage standing wave ratio not greater than 3:1.

5. Components of AN/FRT-56

a. Components. The components comprising the AN/FRT-56 are listed in the basic issue items list (appx II). These components are illustrated in figure 1.

b. Running Spares. These items are listed below and are illustrated in figure 2.

Note: No running spares are authorized at first echelon.

(1) *Tubes.*

Tube type	Quantity	
	In use	Spare
OA2	3	
OB2	2	1
5R4GY	2	1
5V4G	1	1
6AB4	1	1
6AU6	1	1
6AX4	1	1
6336A	1	1
6AQ5	6	3
6BE6	1	1
6C4	1	1
12AU7	3	
TV-100	1	1
872A	2	1
5763	1	1
6146	1	1

(2) *Diodes.*

Diode type	Quantity	
	In use	Spare
1N67	2	1
1N277	2	
1N303	3	
1N34	4	2
YR-100-200R5	1	1

(3) *Lamps.*

Lamp type	Quantity	
	In use	Spare
NE51	3	1
44	1	1
3S6	4	2

(4) *Fuses.*

Fuse type	Quantity	
	In use	Spare
AGC-1/4	1	6
AGC-2	2	12
AGC-3	1	6
AGC-5	1	6
MDL-1/10	1	6
AGC-15	2	12

6. Description (fig. 1)

a. Radio Transmitting Set AN/FRT-56.

(1) The AN/FRT-56 includes an rf output assembly (not nomenclatured); Oscillator, Radio Frequency Oscillator O-330B/FR; Standing Wave Ratio Indicator IM-166/URT; Power Supply PP-2765A/URA-36; Power Supply PP-2766/URA-36, and Power Distribution Panel SB-1577/FRT. All these components are contained in Electrical Equipment Cabinet CY-3703/FRT-56 (cabinet). The front of the CY-3703/FRT-56 is open to allow for mounting, maintenance, and operation of the various components. The rear of the cabinet contains a door, which may be opened for maintenance purposes. A large fan is mounted on the rear door to provide air circulation. The cabinet contains two air filters. One is located adjacent to the fan, and the other at the top of the cabinet. Attached at the rear of the cabinet are two spring-loaded counterweights. These counterweights are

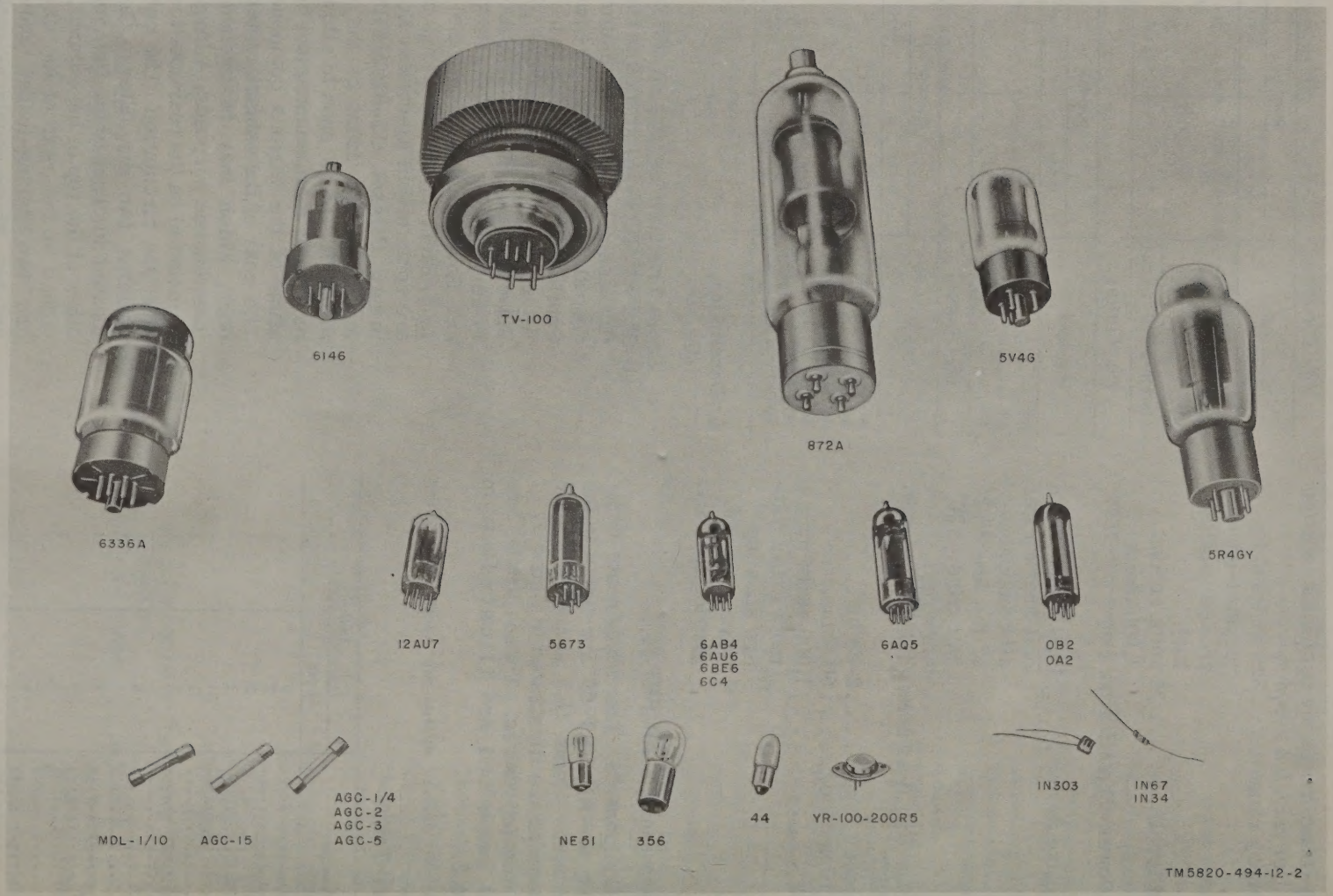


Figure 2. Running spares.

connected to the rear cabling of the various components to prevent snagging of the cables when these components are pushed into the cabinet.

(2) All components, except the rf output assembly, the IM-166/URT, the SB-1577/FRT, and the PP-2766/URA-36, are equipped with drawer slides which permit the components to be pulled out. The IM-166/URT and the SB-1577/FRT are held in place in the cabinet by four screws each. The rf output assembly is attached to the rear panel. The PP-2766/URA-36, the heaviest component, is located at the bottom of the cabinet for greater weight support.

(3) The primary power connection for the AN/FRT-56 is made at the SB-1577/FRT which, in turn, distributes the power to the remaining components and and alternating-current (ac) power outlet terminal strip.

b. Standing Wave Ratio Indicator IM-166/URT. The IM-166/URT is located at the top of the cabinet. The unit provides an accurate indication of the voltage standing wave ratio in a transmitter antenna, and an indication of forward and reflected rf power. A scale selector switch on the front panel turns the unit on and off, and selects the meter scale. The meter is a dual-pointer type, with three scales: FORWARD-WATTS, WATTS-REFLECTED, and VSWR. The VSWR is read by observing the location at which the two pointers cross. The inputs to the IM-166/URT are provided by jacks.

c. Rf Output Assembly (fig. 3). The rf output assembly is located behind the IM-166/URT and is not visible unless the IM-166/URT is removed from the cabinet. The rf output assembly contains relays that interconnect the antenna to the AM-2785A/

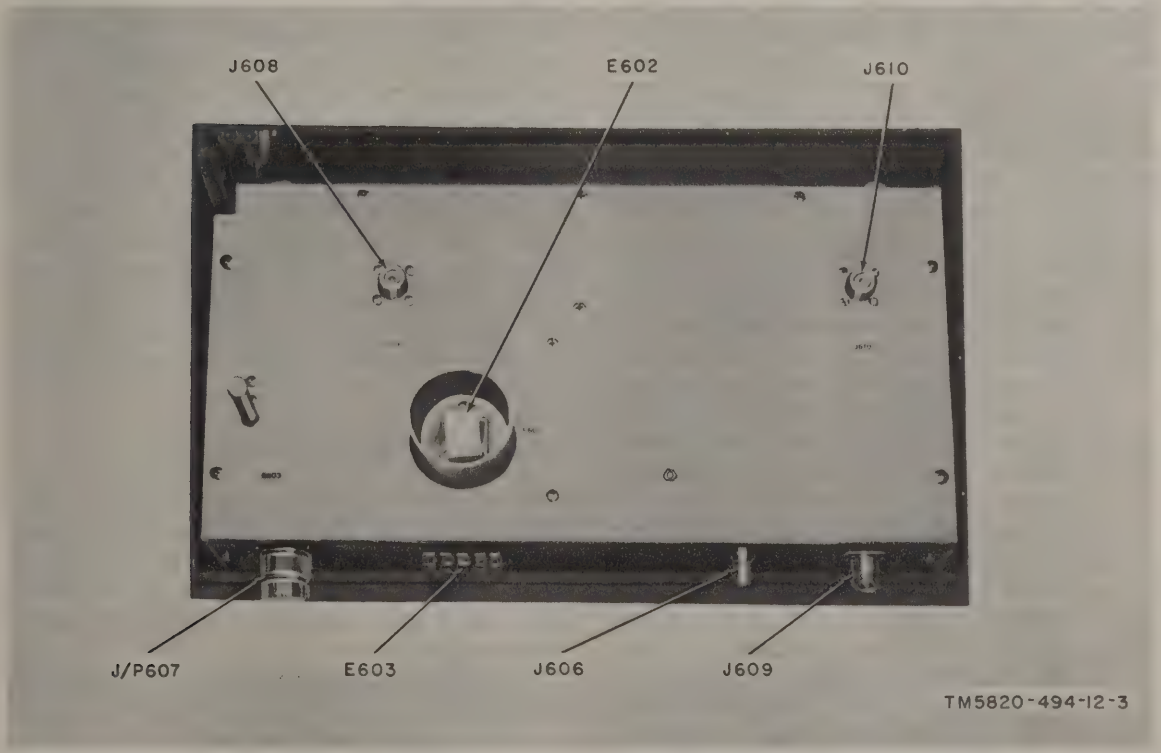


Figure 3. Rf output assembly, front view.

URA-36 and to an external receiver. Antenna connections to the IM-166/URT are also made through the rf output assembly.

d. Radio Frequency Amplifier AM-2785A/URA-36. The AM-2785A/URA-36 is slide-mounted on tracks within the cabinet. High voltage for the AM-2785A/URA-36 is supplied by the PP-2766/URA-36; all other ac and direct current (dc) operating potentials are supplied by the PP-2765A/URA-36. Two front-panel meters monitor circuit conditions within the AM-2785A/URA-36. An ALDC switch on the rear panel selects application of a gain control voltage to rf stages within the AM-2785A/URA-36 or to an external exciter. Cover interlocks remove the high voltage when the top or bottom covers are removed.

e. Oscillator, Radio Frequency O-330B/FR. The O-330B/FR is slide mounted on the cabinet just below the AM-2785A/URA-36. Operating controls are on the front panel and a subpanel accessible through a door on the upper left side of the front panel. Fuses, signal and power connectors, and a crystal-selector switch are at the rear of the chassis. Output frequencies in the 2- to 4-mc range may be read directly on the MASTER OSCILLATOR FREQUENCY dial. Higher output frequencies are determined by multiplying the dial reading by a multiplication factor.

f. Power Supply PP-2765A/URA-36.

(1) The PP-2765A/URA-36 is slide-mounted below the two blank panels. All operating controls, indicators, and fuses are on its front panel. Three adjustment controls are on a small shelf mounted behind the upper left portion of the front panel. These controls are made accessible when the PP-2765A/URA-36 is pulled out on its drawer slides.

(2) All connections consist of a coaxial jack, a three-pronged jack, two multipin jacks, and a terminal board. The three-pronged jack and the terminal board are used for connections to the SB-1577/FRT. One of the multipin jacks connects the ac power to the PP-2766/URA-36; the other multipin jack connects the required operating voltages to the AM-2785A/URA-36. This jack also couples the automatic load and drive control (aldc) signal from the AM-2785A/URA-36 to the PP-2765A/URA-36, where it is made available at a coaxial jack for routing to the external exciter.

g. Power Distribution Panel SB-1577/FRT. The SB-1577/FRT routes primary power from an external power source to the various units of the AN/FRT-56. The MAIN POWER circuit breaker, a power indicator lamp, two utility outlets, and two fuses are mounted on the front panel. Metal links on a board permit strapping of the SB-1577/FRT for either 115- or 230-volt ac operation. All external connections to external exciters or the PP-2765A/URT are made through two terminal boards and a multipin jack on the rear panel.

h. Power Supply PP-2766/URA-36. The PP-2766/URA-36 is located at the bottom of the cabinet. Primary power for the PP-2766/URA-36 is supplied from the PP-2765/URA-36. An output of 3,000 volts dc is cabled to the AM-2785A/URA-36. All connections to the PP-2766/URA-36 are made through two connectors located in a compartment in the chassis. A small door on the front panel, which is held closed by a 1/4-turn fastener, provides access to the blower assembly. Two interlocks behind this door remove the high voltage and turn off the blower when the door is opened. An interlock at the top-right side of the chassis removes the high voltage when the top cover is removed.

7. Additional Equipment Required

The additional equipment required for the AN/FRT-56 falls into two categories. The items listed in *a* below are required for *all* types of operation. The items listed in *b* and *c* are required for specific types of operation.

a. Items Required for All Types of Operation.

(1) *Antenna and transmission line.* A 52-ohm antenna and transmission line is required to radiate the rf

signal generated by the AN/FRT-56.

(2) *Dummy load.* A 52-ohm, 1,000-watt dummy load (such as Electrical Dummy Load DA-212/FRA-51) is required to terminate the AN/FRT-56 in its proper impedance and to dissipate the rf energy generated when it is being tuned.

b. Sideband and Low-Level Amplitude Modulation.

(1) A sideband exciter assembly (such as Modulator-Power Supply Group AN/URA-28A) is required to provide excitation of the AM-2785A/URA-36 for voice communications. The AN/URA-28A fits into the equipment rack when the two blank panels are removed. Refer to TM 11-5820-472-12 for installation instructions.

(2) A high-impedance (500,000-ohm) microphone must be used with the AN/URA-28A to provide voice communication.

c. Teletypewriter, Facsimile, or Frequency Modulated Communication. An exciter unit (such as Exciter Unit O-5C/FR) is required to provide excitation of the AM-2785A/URA-36 for teletypewriter, facsimile, or frequency modulated communications. Refer to TM 11-2205B for operation and installation of the O-5C/FR.

CHAPTER 2

INSTALLATION AND INITIAL ADJUSTMENTS

8. Siting

The distance range that can be obtained with the AN/FRT-56 largely depends on the selection of a suitable location for the antenna. Ground conductivity and height of surrounding terrain and obstructions should be carefully considered before the final decision is made. Where possible, the station's transmitting and receiving functions should be situated at widely separated locations to eliminate any possibility of interference. The selection of a site and design of the installation should be undertaken only by trained personnel.

9. Housing or Shelter Requirements

The best location for the AN/FRT-56 is a position as close as possible to the transmitting antenna. The shelter used to house the AN/FRT-56 should provide the following:

a. Protection from bad weather.

b. A dry, secure mounting, free from vibration, that furnishes support for the equipment in a level position.

c. Sufficient space for satisfactory maintenance and operation of the equipment. This space should allow for removal of the components from the cabinet.

d. Adequate lighting for day and night operations, with the front panel markings easily recognizable.

e. Adequate ventilation must be provided. Operation of the AN/FRT-56 in a poorly ventilated room will cause the surrounding temperature to become too high. Temperature and humidity control and filtering should be used when dust, humidity, or temperature is extreme.

10. Checking Unpacked Equipment

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage according to instructions in paragraph 2.

b. See that the equipment is completed as listed on the packing slip. If a packing slip is not available, check the equipment against the basic issue items list in appendix II. However, the absence of a minor component that does not affect proper functioning of the equipment should not prevent the equipment from being used.

c. If the equipment has been used or reconditioned, see if it has been changed by a modification work order (MWO). Current MWO's applicable to the equipment are listed in DA Pamphlet 310-4. If modified, the MWO number will appear on the front panel near the nomenclature plate.

11. Uncrating and Unpacking (fig. 4)

Move the AN/FRT-56 to its intended site before uncrating or unpacking.

a. Uncrating and Unpacking Procedure. The entire AN/FRT-56, including spare parts, is packed in wooden crates. The large units are individually crated. When unpacking the equipment, proceed as follows:

(1) Place the wooden crate near the position where the equipment is to be installed.
(2) Cut and remove the steel straps.
(3) Remove the nails with a nailpuller.
(4) Remove the top and sides of the crate.

Caution: **Prying off the sides or top of the crate may result in damage to the equipment.**

(5) Lift out the moistureproof barrier containing the outer carton.
(6) Remove the gum seal on the moistureproof barrier and remove the outer carton.
(7) Open the carton and remove the moisture-vaporproof barrier containing the inner carton. Remove the inner carton. Open the inner carton and remove the contents.

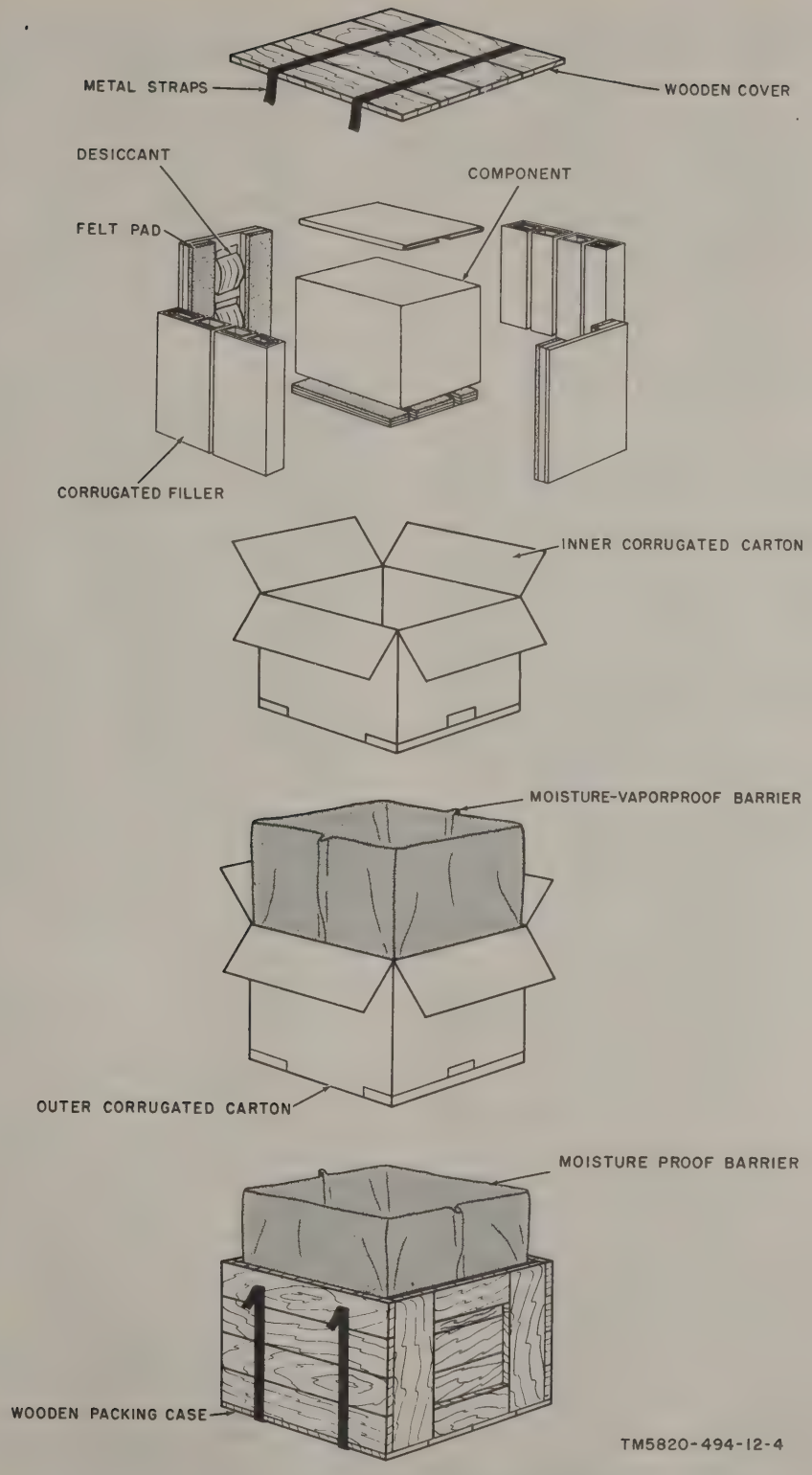


Figure 4. Typical packaging diagram.

b. Component Dimensions.

Component	Height (in.)	Depth (in.)	Width (in.)	Unit weight (lb)
Standing Wave Ratio Indicator IM-166/URT	8	7	19	16
Radio Frequency Amplifier AM-2785A/URA-36	8-3/4	17-1/8	19	40
Power Supply PP-2765A/URA-36	10-1/2	12	19	60
Power Supply PP-2766/URA-36	15-3/4	16-1/4	19	260
Radio Frequency Oscillator O-330B/FR	10-1/2	16	19	75
Power Distribution Panel SB-1577/FRT	4	10	19	40
Rf output assembly	8-1/2	3-11/32	16-3/4	5
Electrical Equipment Cabinet CY-3703/FRT-56	72-1/2	22-1/2	20-5/8	330

12. Equipment Installation Procedures (fig. 5, 22, and 23)

All components, except the SB-1577/FRT and the rf output assembly, are shipped in individual containers. The SB-1577/FRT and the rf output assembly are shipped in place in Electrical Equipment Cabinet CY-3703/FRT-56. Before installing the remaining components in the cabinet, check to see that cable CA-588-1 is connected between the ac output terminals on the SB-1577/FRT and the ac power outlet terminal strip (fig. 22). Also see that plug P603 is mated to jack J603 to provide power for blower B601. To install the remaining components, proceed as indicated below. (Refer to paragraph 14 for installation details of slide-mounted and panel-mounted components.)

a. Choose a location that meets the requirements listed in paragraph 9.

b. The cabinet has predrilled holes for permanent mounting. The holes are at the base of the cabinet. Use these holes as templates for drilling holes in the floor of the shelter.

c. Use bolts to secure the cabinet to the floor.

d. Connect cable CA-493 (W612) between ac input jack J601, and the ac input terminals of the SB-1577/FRT.

e. Place Power Supply PP-2766/URA-36 in position so that the rear edges of the sliders on the bottom of the component are resting on the front edge of the cabinet base.

f. Connect plug P615, on the end of cable CA-490(W605), to jack J401 on the PP-2766/URA-36.

g. Extend the tracks of the drawer slides just above the SB-1577/FRT, and slide Power Supply PP-2765A/URA-36 onto the tracks until the release buttons catch. Press the release buttons and push the component into the cabinet until the release buttons engage the holes in the tracks.

h. Connect plug P401, on the cable extending from the PP-2766/URA-36, to jack J702 on the PP-2765A/URA-36.

i. Push the PP-2766/URA-36 into the cabinet and secure it with eight screws.

j. Connect plug P601, on cable CA-509(W611) (which extends from the ac output terminals of the SB-1577/FRT), to jack J703 on the PP-2765A/URA-36.

k. Connect the numbered fan-stripped leads of cable CA-506 (extending from SB-1577/FRT) to the terminals of E302 on the PP-2765A/URA-36.

l. Connect plug P614, on cable CA-491(W606), to jack J701 on the PP-2765A/URA-36.

m. Push the PP-2765A/URA-36 into the cabinet and secure it with eight screws.

n. Extend the tracks of the drawer slides just above the top blank panel and position the O-330B/FR in the cabinet; follow the same procedure to secure the C-330B/FR as for the PP-2765A/URA-36 (*g* above).

o. Connect plug P203, on cable CA-435-3 (W202) (which extends from the O-330B/FR), to jack J613 on the ac power outlet terminal strip.

p. If not already installed, attach the rf output assembly (fig. 3) on the rear panel within the cabinet and secure with seven screws.

q. Connect plug P607, on cable CA-506 (W610), to jack J607 on the rf output assembly.

r. Connect a jumper between terminals 2 and 3 of E603 on the rf output assembly.

s. Connect the associated antenna cables to jacks J609 and J606 on the rf output assembly.

t. Extend the tracks of the drawer slides just above the O-330B/FR and position the AM-2785A/URA-36 in the cabinet; follow the same procedure to secure the AM-2785A/URA-36 as for the PP-2765A/URA-36 (*g* above).

u. Push the O-330B/FR into the cabinet and secure with eight screws.

v. Connect plug P505, at the end of the cable (with the large connector) extending from the AM-2785A/URA-36, to jack J605.

w. Connect plug P504, at the end of the cable (with the small connector) extending from the AM-2785/URA-36, to jack J604.

x. Push the AM-2785A/URA-36 into the cabinet and secure it with four screws.

y. Place the IM-166/URT in position so that the rear edges of the slider on the bottom of the components are resting on the front panel of the AM-2785A/URA-36.

z. Connect plug P608, on cable CA-512-2-23 (W603), to jack J608 on the rf output assembly.

aa. Connect plug P605, on the end of cable CA-512-2-23 (W603), to jack J304 on the IM-166/URT.

ab. Connect plug P610, on cable CA-512-2-23 (W604), to jack J610 on the rf output assembly.

ac. Connect the other end of cable CA-512-2-23 (W604) to jack J305 on the IM-166/URT.

ad. Push the IM-166/URT into the cabinet and secure with four screws.

ae. Connect the power cable from a 115-volt ac, 1,900-watt power source to jack J601.

13. Rewiring for Conversion From 115- to 230-Volt Ac Source

The equipment may be operated from a 115- or 230-volt ac source. This procedure assumes that the equipment will be delivered wired for 115-volt operation and must be rewired for a 230-volt ac source. To convert this equipment from 115-volt operation to 230-volt operation, perform the following wiring, fuse, and circuit breaker changes. (If the equipment is delivered wired for 230-volt operation and must be operated from a 115-volt ac source, adapt these instructions accordingly.)

a. O-330B/FR.

(1) *E301 and E202.* Refer to figure 6 for wiring changes.

(2) *Transformer T101.* Refer to figure 7 for wiring changes.

(3) *OVENS fuse.* Change from 3 amperes to 1.5 amperes.

(4) *POWER fuse.* Change from 2 amperes to 1 ampere.

b. PP-2765A/URA-36.

(1) *Transformer T701.* Remove the connection from the 115-volt tap and connect it to the 230-volt tap (fig. 8).

(2) *Circuit breaker CB701.* Refer to figure 8 for wiring changes.

c. SB-1577/FRT.

(1) *Ac output terminals.* Refer to figure 8 and place the metal links as indicated.

(2) *UTILITY POWER fuses.* This equipment is delivered with two 230-volt, 15-ampere fuses installed. When operation from a 115-volt ac source is required, these two fuses may be changed to 30-ampere fuses.

d. PP-2766/URA-36. Refer to figure 8 and change the wiring on the primary of T401.

14. Component Installation (fig. 9)

Complete the wiring modifications for 115-volt or 230-volt operation (para 13) before performing this procedure. All components are slide-mounted, except the SB-1577/FRT, IM-166/URT, and the rf output assembly. Refer to figures 1 and 5 for component location within the cabinet.

a. Installation of Slide-Mounted Components.

Warning: **Two men should install the heavy components such as the O-330B/FR and the two power supplies.**

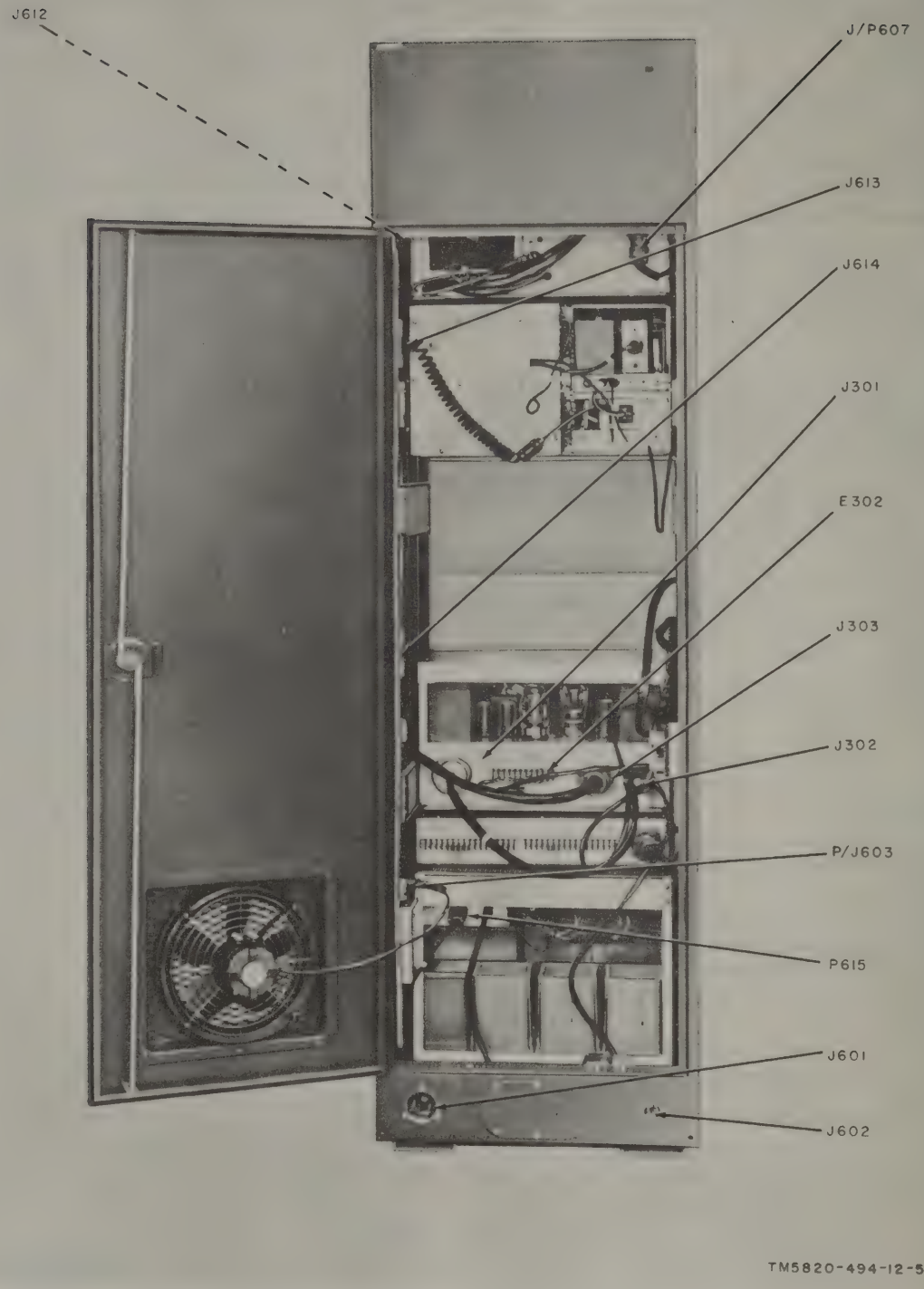


Figure 5. Radio Transmitting Set AN/FRT-56, rear view.

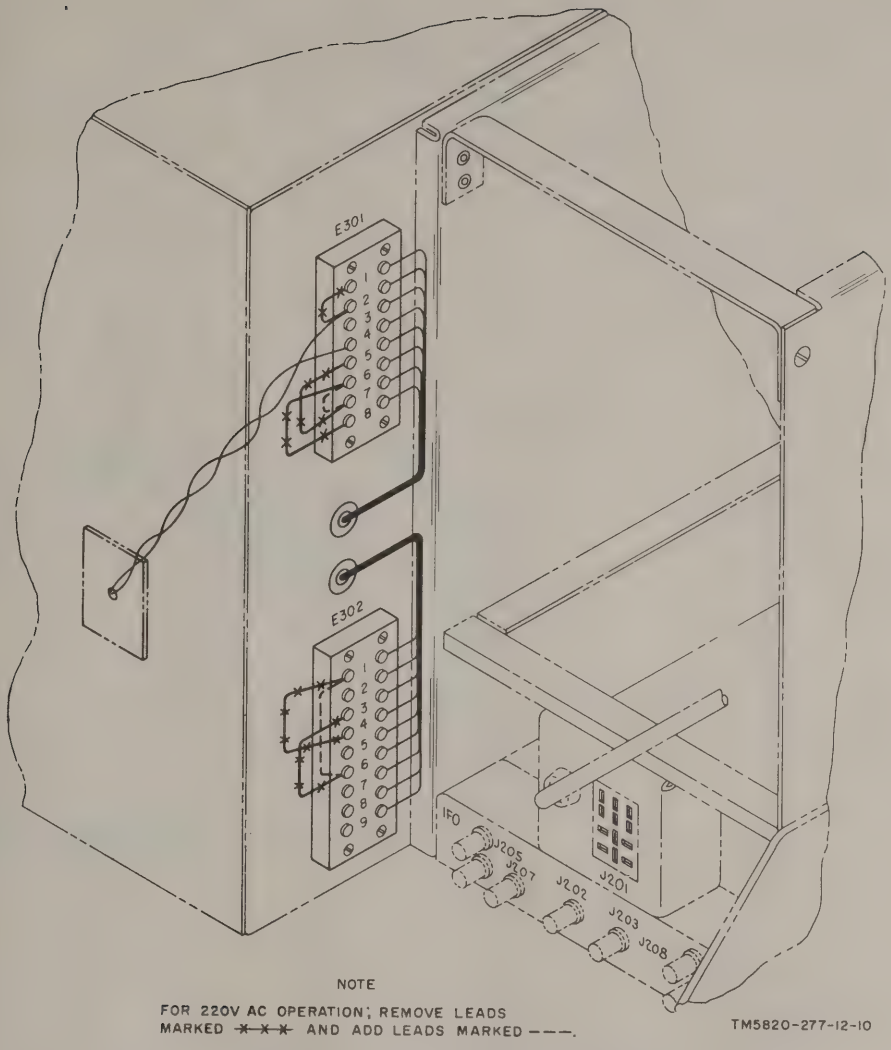


Figure 6. O-330B/FR oven terminal boards, input voltage wiring.

Note: Make sure that the rf output assembly is mounted (para 12*p*) before installing the AM-2785A/URA-36.

(1) Set the component in position on the tracks.

Note: It may be necessary to hold the tracks in the extended position while positioning the component.

(2) Slide the component on the tracks until the release buttons catch.

(3) Press the release buttons and push the component into the cabinet until the release buttons engage the holes in the component.

(4) Refer to paragraph 12 for cable connection instructions.

(5) When all components have been installed and cabled, press the release buttons and push the component into the cabinet.

(6) Secure the front panel to the cabinet with screws.

b. Installation of Panel-Mounted Components (IM-166/URT and SB-1577/FRT).

(1) Set the component in position within the cabinet.

(2) Refer to paragraph 12 for cable connection instructions.

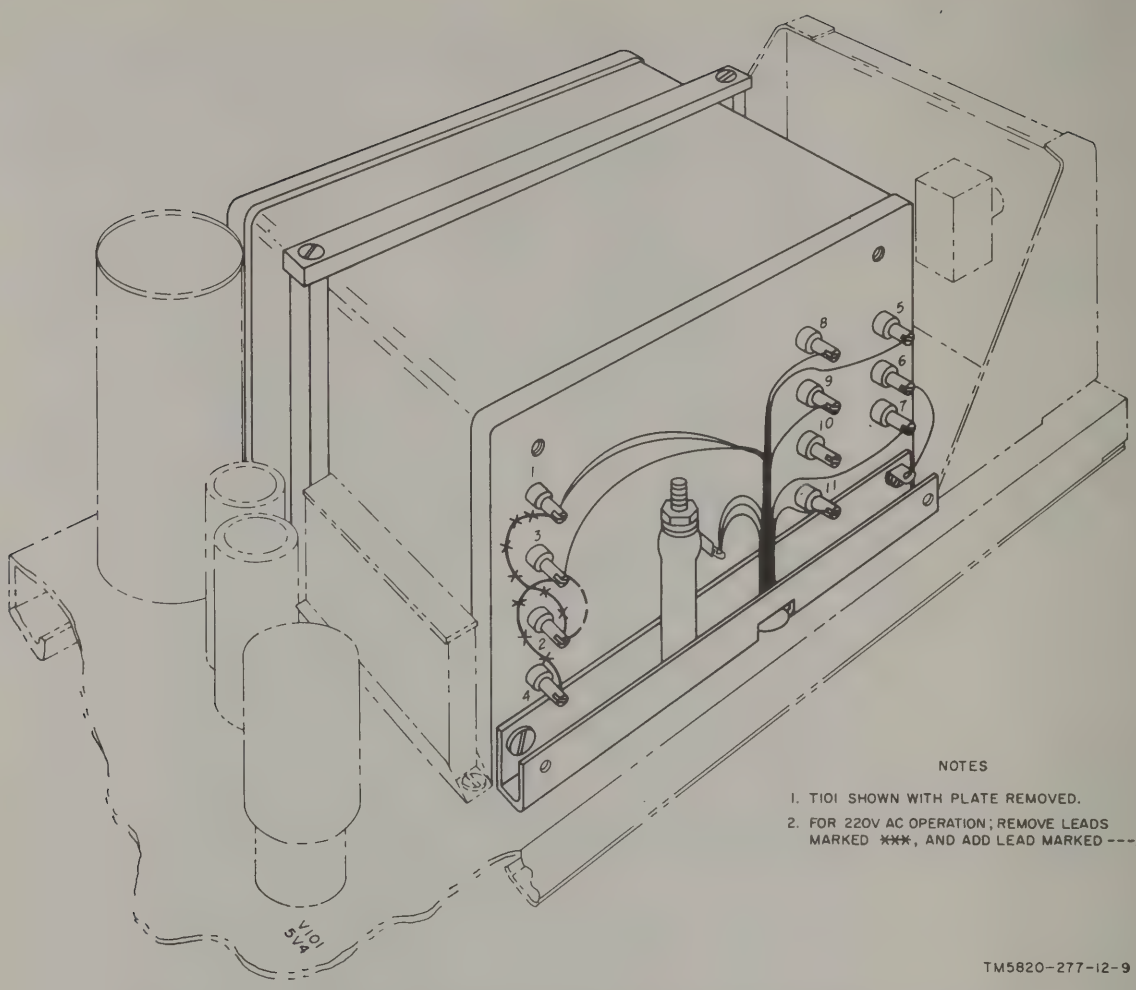


Figure 7. O-330B/FR power supply transformer T101, input voltage wiring modification.

(3) When *all* components have been installed and cabled, push the component into the cabinet; make sure the cables do not kink or bind.
(4) Secure the front panel to the cabinet with screws.

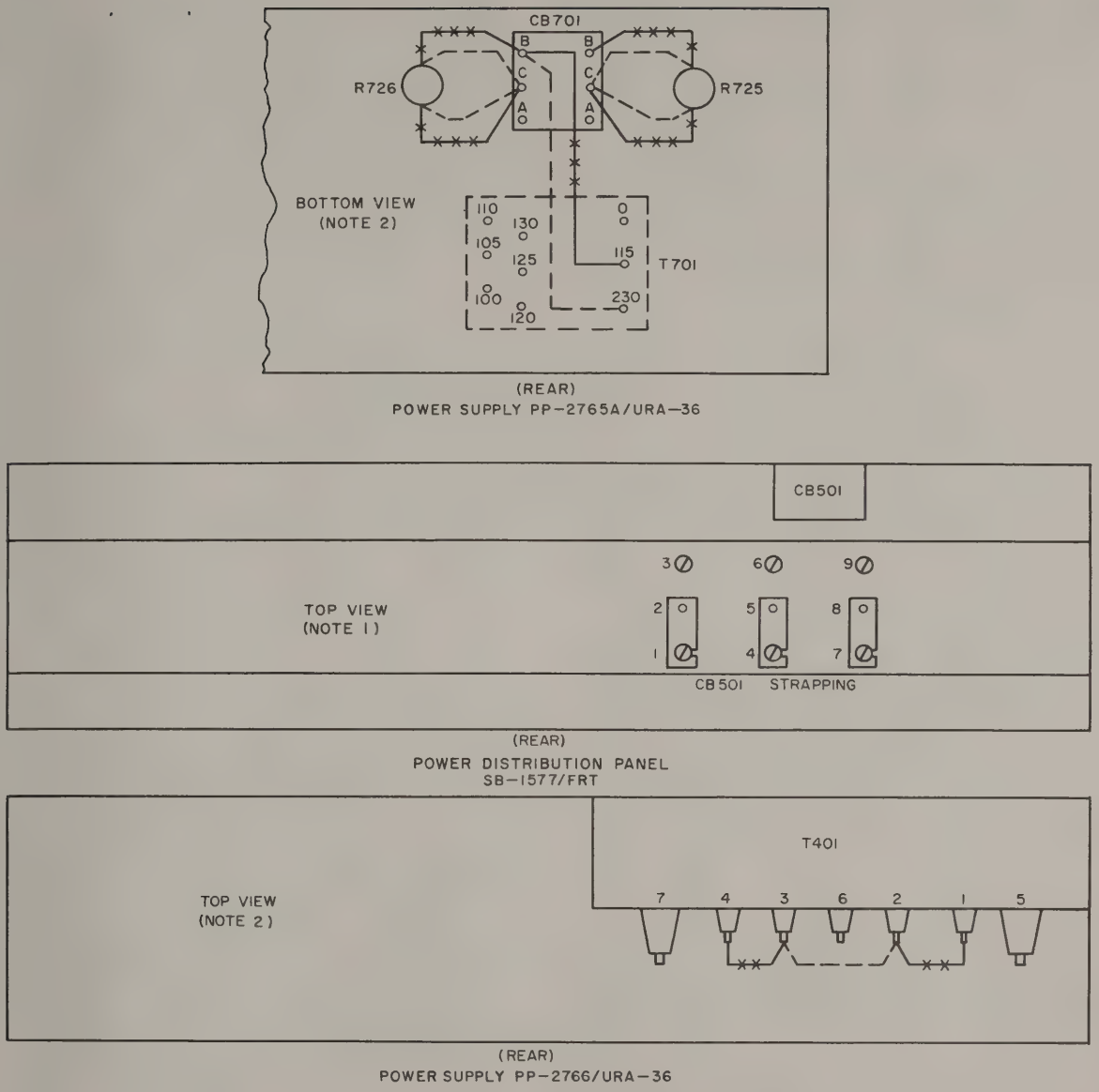
15. External Equipment Connections (fig. 22)

Except for the antenna connections to J609 and J606 on the rf output assembly, all external equipment is connected to E501 and E502 on the rear panel of the SB-1577/FRT. Subparagraphs *a* through *h* below list the connections that must be made for the operations indicated below:

a. Sideband or Amplitude Modulation.

Note: Refer to paragraph 7 for additional equipment required.

(1) *Channel 1 input.* For balanced line input, ground terminal 14 of E501 and apply balanced signal input to terminals 13 and 15. For unbalanced line input, ground terminal 15 of E501 and apply unbalanced signal between terminal 13 and 15 (ground).
(2) *Channel 2 input.* For balanced line input, ground terminal 19 of E502



NOTES:

1. FOR 115V AC OPERATION, CONNECT TERMINALS 1 AND 2, 4 AND 5, 7 AND 8.
   FOR 230V AC OPERATION, CONNECT TERMINALS 2 AND 3, 5 AND 6, 8 AND 9.
2. FOR 115V AC OPERATION, CONNECT LEADS MARKED ×××
   FOR 230V AC OPERATION, CONNECT LEADS MARKED – – – – –

TM5820-494-12-6

Figure 8. AN/FRT-56, input voltage wiring modifications.

and apply balanced signal input to terminals 18 and 20. For unbalanced line input, ground terminal 20 of E502 and apply the unbalanced signal between terminal 18 and 20 (ground).

b. Remote Operation. Connect the leads from an on-off switch (or relay terminals)

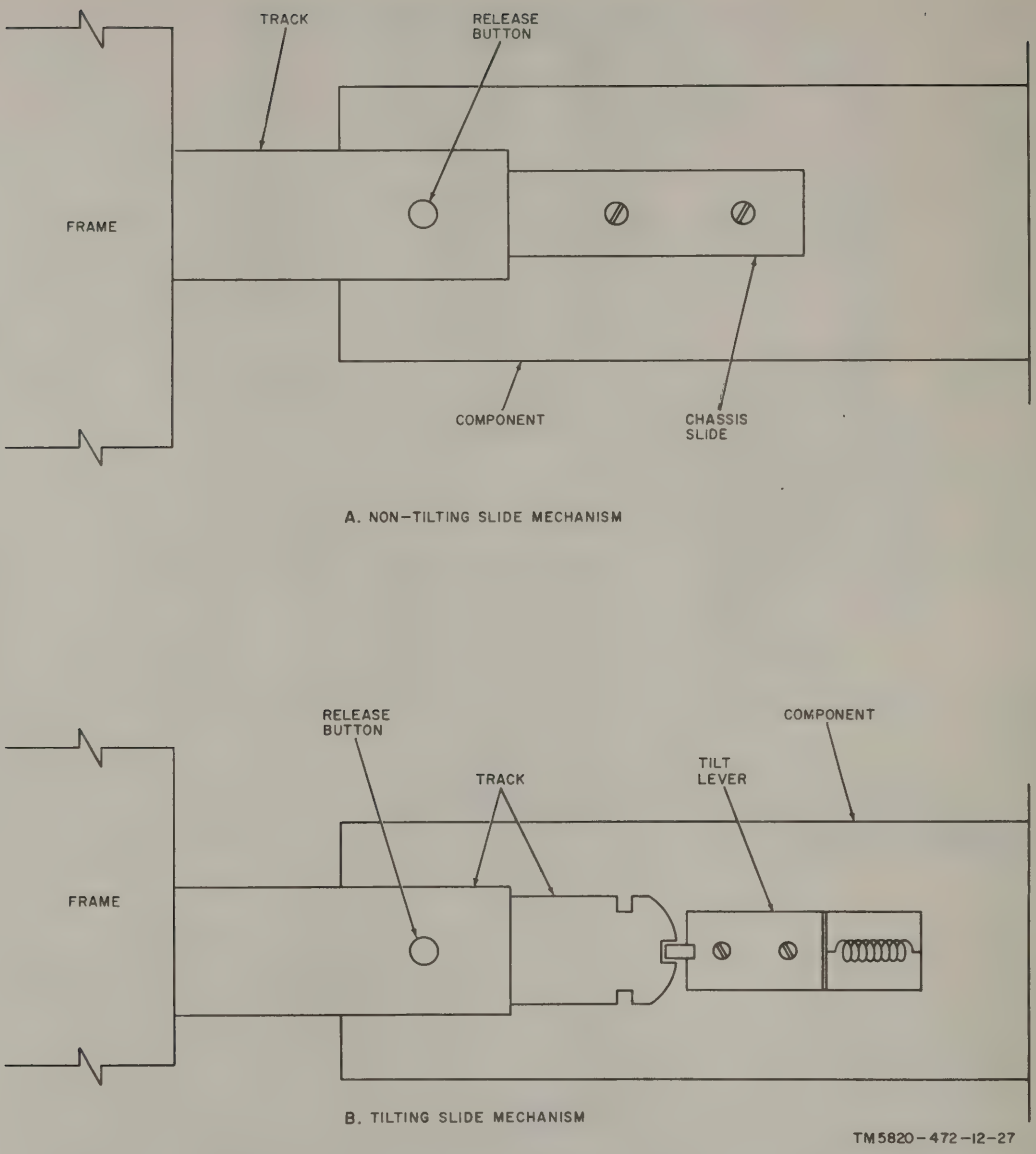


Figure 9. Slide-mounting details.

between terminals 2 and 1 of E501. (During remote operation, the TRANSMITTER VOLTAGES switch on the PP-2765A/URA-36 is left at STAND BY and the transmitter is turned on when terminal 2 of E501 is grounded by action of the remote switch.)

c. External Interlocks. Terminals 5 through 8 of E501 are series-connected with the transmitter interlock circuit. To connect external equipment in series with this interlock circuit, remove the jumper from terminals 5 and 6 (or from 7 and 8) and connect the external interlock circuit in series with these terminals.

d. Teletypewriter Operation. Exciter Unit O-5C/FR is required when the AN/FRT-56 is used for teletypewriter operation. To connect the O-5C/FR:

(1) Disconnect the cable connected to

jack J202 on the rf multiplier chassis of the O-330B/FR.

(2) Reconnect this cable to EXT. OSC. jack J2 on the rear of the O-5C/FR.

(3) Connect a Radio Frequency Cable RG-59/U, terminated at each end with a type UG-260/U plug, between jack J202, on the rf multiplier chassis of the O-330B/FR, and the OUTPUT jack on the rear of the O-5C/FR.

16. Checking Cable Connections (fig. 22)

Before operating the equipment, check to see that the connections listed below have been made.

Cable No.	From	To
W202	O-330B/FR, P203	Ac power outlet terminal strip, J613.
W603	Rf output assembly, J608	IM-166/URT, J304.
W604	Rf output assembly, J610	IM-166/URT, J305.
W605	AM-2785A/URA-36, J604	PP-2766/URA-36, J401.
W606	AM-2785A/URA-36, J605	PP-2765A/URA-36, J701.
W610	PP-2765A/URA-36, E302	Rf output assembly, J607.
W611	Ac output terminals on SB-1577/FRT	PP-2765A/URA-36, J703.
W612	Ac input jack, J601	Ac input terminals on SB-1577/FRT.
CA-588-1	Ac output terminals on SB-1577/FRT	Ac power outlet terminal strip.
Cable (p/o PP-2766/URA-36)	PP-2766/URA-36	PP-2765A/URA-36, J702.
Cable (p/o fan)	Fan	Jack J603.

17. Preoperational Check of Tubes, Fuses, and Crystals

The AN/FRT-56 is shipped with all tubes, fuses, and crystals installed. After the AN/FRT-56 has been installed (para 12), and before turning the equipment on, perform the following checks:

a. Tubes. Refer to figures 17 through 21 to see that all tubes are correctly installed in the proper sockets. (To reach the tubes, refer to the procedures given in paragraphs 42 and 44.)

b. Fuses. Be sure that fuses of the proper value are contained in the fuseholders of all the components in the AN/FRT-56. The following chart shows the value of each fuse and indicates its location:

Component	Panel marking and symbol	Rating (ohm)	Figure reference
O-330B/FR	OVENS (F101)	3[a]	13
	POWER (F102)	2[b]	13
PP-2765A/URA-36	LINE (F301)	5	14
	BLOWER (F302)	2	14
	L. V. B- (F303)	0.1	14
	M. V. B+ (F304)	0.25	14
SB-1577/FRT	UTILITY POWER (F501).	15	15
	UTILITY POWER (F502).	15	15

[a] For 230-volt operation, change this fuse to 1.5 amperes.
[b] For 230-volt operation, change this fuse to 1 ampere.

c. Crystals. Check to see that all crystals are correctly installed in the proper crystal sockets. Refer to the chart below. (To reach the crystals, refer to the procedures given in paragraph 45.)

Crystal function[a]	Crystal symbol
Bfo	Y101
Bfo	Y102
Hfo	Y202
Hfo	Y203
Hfo	Y204
Ifo	Y201

[a] The use of the O-330B/FR within the AN/FRT-56 depends upon the additional equipment that is used with the AN/FRT-56. Refer to TM 11-5820-472-12 when single sideband (ssb) equipment is used with the AN/FRT-56. Refer to TM 11-5820-277-12 for details on all crystal functions.

18. Initial Adjustments and Calibration

Note: Before the AN/FRT-56 is operated, perform the procedures given in this paragraph.

a. O-330B/FR. The high-frequency output of the variable frequency-oscillator (vmo) in the O-330B/FR can be adjusted to any frequency between 2 and 4 mc. The MASTER OSCILLATOR FREQUENCY knob and the CALIBRATE control (fig. 12) are used when frequencies are changed. The procedures for setting the CALIBRATE control are detailed below. The O-330B/FR requires a warmup period of at least 48 hours prior to its actual operation in

the AN/FRT-56. Set the SB-1577/FRT MAIN POWER circuit breaker to ON. Set the O-330B/FR POWER switch to ON and allow the necessary warmup time before making any adjustments. After the initial warmup period, proceed as follows:

(1) Set the BEAT and HFO switches to ON (fig. 12).
(2) Plug a headset into the PHONES jack.
(3) Turn the BAND-MCS switch to 2-4.
(4) Turn the XTAL switch to VMO.
(5) Turn the MASTER OSCILLATOR FREQUENCY knob until a reading of 2,000 kilocycles (kc) is obtained in the KCS window; note whether the direction of approach to this frequency is from a higher reading to a lower reading or from a lower reading to a higher reading.
(6) Loosen the LOCK knob behind the CALIBRATE control. Vary the CALIBRATE control until a zero-beat null is obtained in the headset or on the ZERO BEAT panel lamp. (The ZERO BEAT lamp is normally lighted. As zero beat is approached, it will blink on and off erratically. At the zero beat, the lamp will go out.)
(7) Turn the MASTER OSCILLATOR FREQUENCY knob until a reading of 4,000 kc is obtained in the KCS window; approach this frequency in the same direction as the 2,000 kc frequency was approached. (For example, if in the procedure given in (5) above, 2,000 kc was approached from a higher frequency, turn the knob until a reading of over 4,000 kc is obtained; then, set to 4,000 kc.)
(8) Remove the front-panel cap that covers trimmer C303 and adjust trimmer C303 with a screwdriver until a zero-beat indication is obtained in the headset and on the ZERO BEAT lamp.
(9) Repeat the procedure given in (5), (6), (7), and (8) above until adjustments of the CALIBRATE control and trimmer C303 produce a zero beat at both 2,000 and 4,000 kc. Tighten the CALIBRATE control knob and check to see that the adjustment has not been disturbed.
(10) Replace the C303 trimmer cover.
(11) Turn off the BEAT and HFO switches.

b. IM-166/URT. Turn the selector switch to OFF and check the positions of the two meter pointers. If either or both of the meter pointers are not at zero (as viewed standing directly in front of the meter), turn the zero-adjust screw for the off-zero pointer (fig. 16) with a small screwdriver until a zero indication is obtained.

CHAPTER 3

OPERATION

Section I. CONTROLS, INDICATORS, AND CONNECTORS

Caution: Following an interval of transmission, be careful when deenergizing the AM-2785A/URA-36. Turn off the FINAL VOLTAGES and TRANSMITTER VOLTAGES, *wait at least 5 minutes* and then set the MAIN POWER switch on the PP-2765A/URA-36 to OFF. This procedure will leave the power amplifier (pa) blower on and permit the pa tube to cool, thus prolonging its life.

19. AM-2785A/URA-36
(fig. 10 and 11)

Control or indicator	Function
MULTI METER switch	Connects meter to any one of eight circuits. *Sw pos* — *Causes meter to read* PA DC: BIAS — Dc control grid voltage of pa tube. SCREEN — Dc screen grid voltage of pa tube. PLATE — Dc plate voltage of pa tube. SCREEN MA — Dc screen grid current of pa tube. RF: 1ST AMPL PLATE — Rf voltage of first amplifier tube. PA GRID — Rf voltage at control grid of pa tube. PA PLATE — Rf voltage at plate of pa tube. OUT — Rf voltage at output of AM-2785A/URA-36.
MULTI METER meter	Indicates dc or rf voltage or dc current from circuit selected by MULTI METER switch.
PA PLATE CURRENT meter	Measures plate current of pa tube.
PA BAND switch	Selects frequency range of pa output circuit.
PA GRID TUNING control	Tunes input circuit of pa tube.
1ST AMPL TUNING control	Simultaneously tunes tuned circuits in plate circuits of first amplifier and driver stages.
PA TUNING dial	Indicates setting of PA TUNING control.
ALDC control	Sets level of aldc output voltage.
PA LOADING dial	Indicates setting of PA LOADING control.
PA LOADING switch	Selects loading capacitor for connection across pa output circuit.
DRIVER BAND switch	Selects frequency range of tuned circuits in grid circuits of both driver and pa tubes.
PA TUNING control	Tunes output circuit of pa tube to desired frequency.
PA LOADING control	Varies loading on pa stage.
ALDC switch	In INT position, causes dc output of aldc circuit to control gain of first amplifier tube. In EXT position, causes aldc output to control gain of external sideband exciter.
NEUT control	Adjusts neutralizing voltage applied to grid of pa tube.

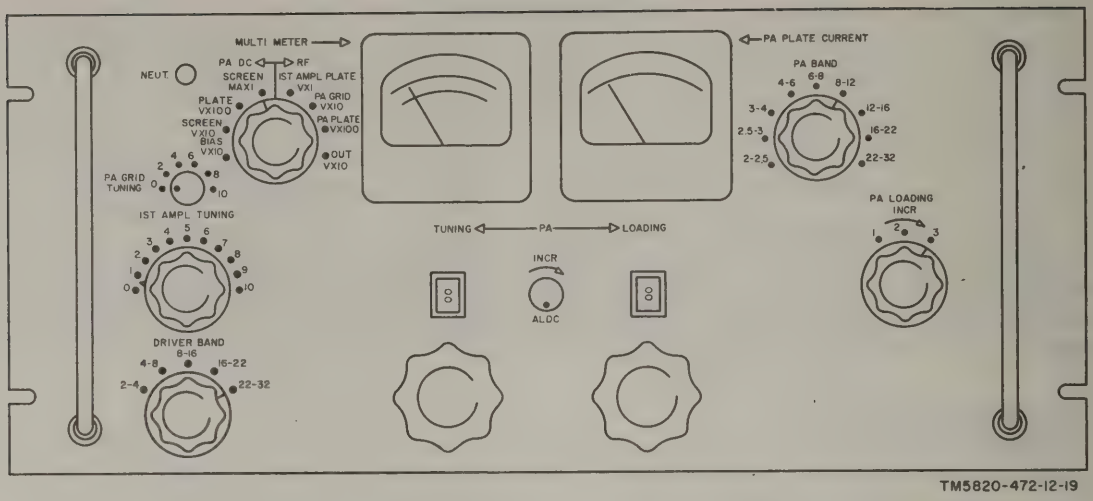


Figure 10. AM-2785A/URA-36, controls and indicators.

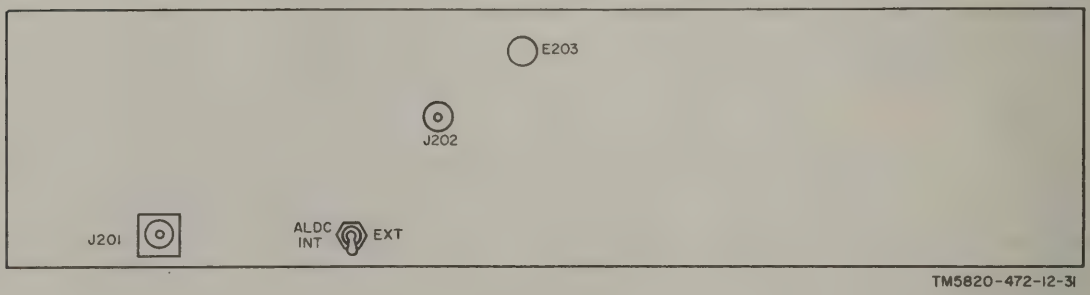


Figure 11. AM-2785/URA-36, rear panel switch and connectors.

20. O-330B/FR

a. Subpanel Controls and Jacks (fig. 12).

Control or jack	Function
POWER switch	Turns O-330B/FR on and off.
HFO switch	Activates hfo[a] section.
IFO switch	Activates ifo[b] section.
BFO switch	Activates bfo[c] section.
BEAT switch	Activates 100-kc oscillator section.
METER switch	Connects meter to output of either hfo, ifo, bfo, or vmo section.
PHONES jack	With a headset, provides audible indication of zero beat during calibration.

[a] High-frequency oscillator.
[b] Intermediate-frequency oscillator.
[c] Beat-frequency oscillator.

b. Front Panel Controls and Indicators (fig. 12).

Control or indicator	Function
TUNING control	Tunes multiplier section of hfo.
OUTPUT control	Adjusts output voltage of hfo section.
BAND-MCS switch	Selects frequency range of hfo section output.

Control or indicator	Function
XTAL FREQ control	Trims hfo section crystals to exact frequency.
XTAL switch	Selects VMO operation or one of three crystal-controlled frequencies.
CALIBRATE control	Calibrates frequency of vmo at calibration checkpoints.
CALIBRATE LOCK control	Locks CALIBRATE control.
Trimmer C303	Balances CALIBRATE control adjustment.
MASTER OSCILLATOR FREQUENCY control.	Controls output frequency of vmo section.
LOCK control	Locks MASTER OSCILLATOR FREQUENCY control.
MAIN POWER pilot lamp	When lighted, indicates power to O-330B/FR is on.
INNER OVEN pilot light	When lighted, indicates power is applied to inner oven.
OUTER OVEN pilot lamp	When lighted, indicates power is applied to outer oven.
ZERO BEAT pilot lamp	Provides visual indication of zero beat during calibration.
Meter	Indicates rf output voltage from circuit selected by METER switch.

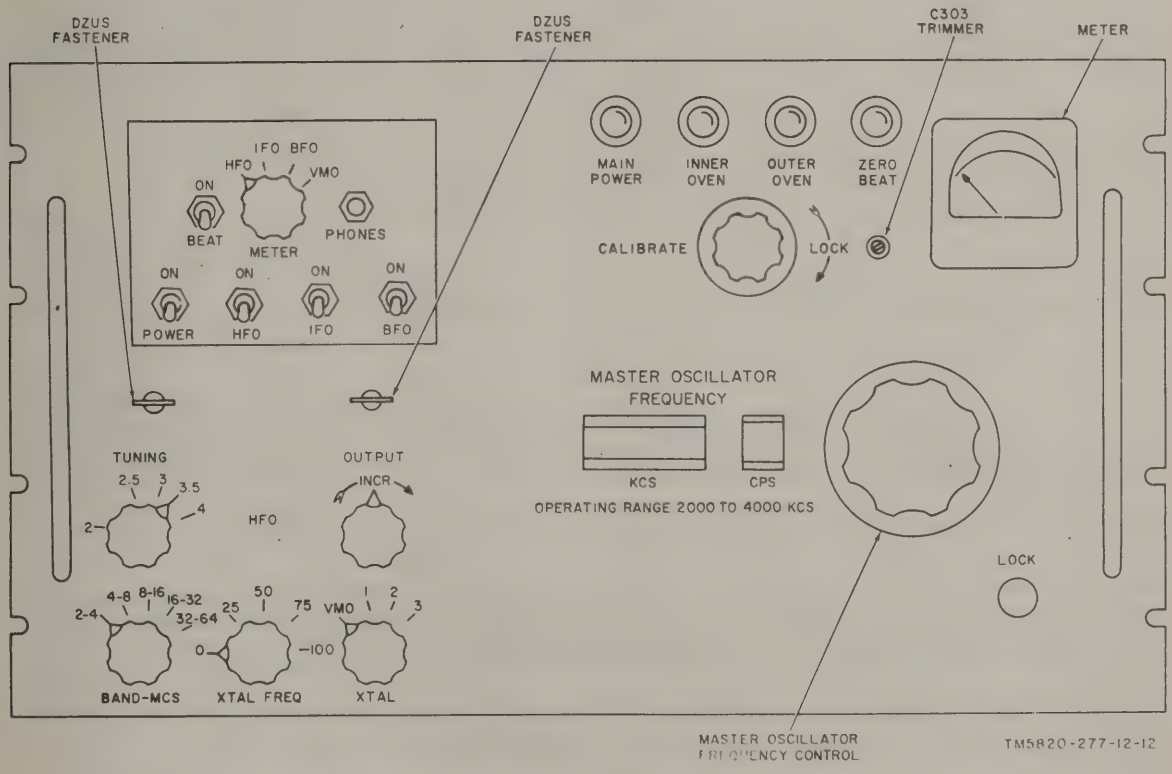


Figure 12. O-330B/FR, controls and indicators.

c. *Real Panel Controls and Jacks* (fig. 13).

Controls and jacks	Function
Y101-Y102 switch	Selects crystal in the bfo section.
J102, J103, J104 jacks	Provide bfo outputs.
J205, J206, J207 jacks	Provide ifo outputs.
J208, J209, J210 jacks	Provide hfo outputs.
R116 control	Adjusts level of bfo output.
J106 jack	Provides connection for external headset.

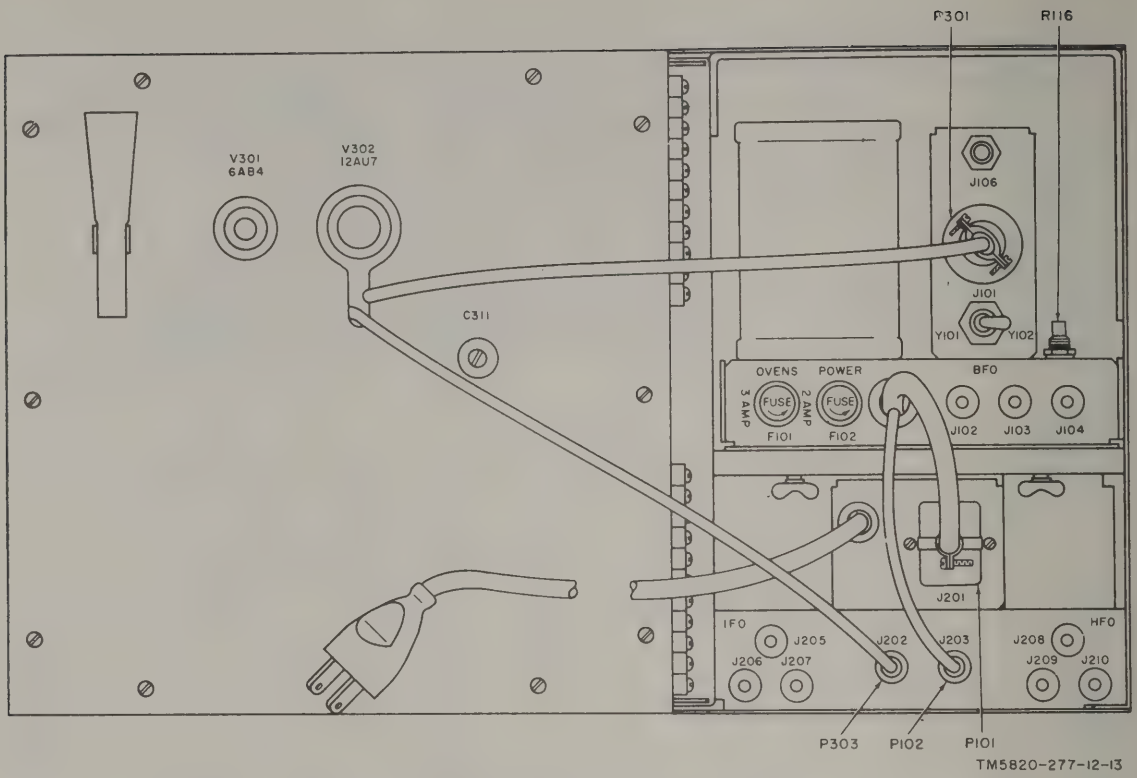


Figure 13. O-330B/FR, rear panel controls and jacks.

21. PP-2765A/URA-36 (fig. 14)

Control or indicator	Function
PA FIL PRI meter	Measures ac voltage applied to transformer primary windings.
PA FIL PRI ADJUST switch	Controls ac voltage applied to transformer primary windings.
PA OVERLOAD PLATE circuit breaker.	Provides overload protection for pa plate supply circuit.
PA OVERLOAD SCRN GRID circuit breaker.	Provides overload protection for pa screen grid supply circuit.
PA OVERLOAD CONT GRID circuit breaker.	Provides overload protection for pa bias supply circuit.
FINAL VOLTAGES pilot lamp	When lighted, indicates that plate and screen voltages are applied to pa stage in AM-2785A/URA-36.
FINAL VOLTAGES switch	In ON position, applies plate and screen voltages to pa stage in AM-2785A/URA-36.
TRANSMITTER VOLTAGES pilot lamp	When lighted, indicates that plate and screen voltages are applied to first amplifier and driver stages of AM-2785A/URA-36.
TRANSMITTER VOLTAGES switch	In ON position, applies plate and screen voltages to first amplifier and driver stages of AM-2785A/URA-36. If FINAL VOLTAGES switch is left at ON, TRANSMITTER VOLTAGES switch applies plate and screen voltages to all stages of AM-3785A/URA-36.
MAIN POWER circuit breaker	Turns power supply on and off.
MAIN POWER pilot lamp	When lighted, indicates power is applied to power supply.
L. V. B- indicator	When lighted, indicates a blown L. V. B- fuse.
M. V. B+ indicator	When lighted, indicates a blown M. V. B+ fuse.
LINE indicator	When lighted, indicates a blown LINE fuse.
BLOWER indicator	When lighted, indicates a blown BLOWER in fuse.

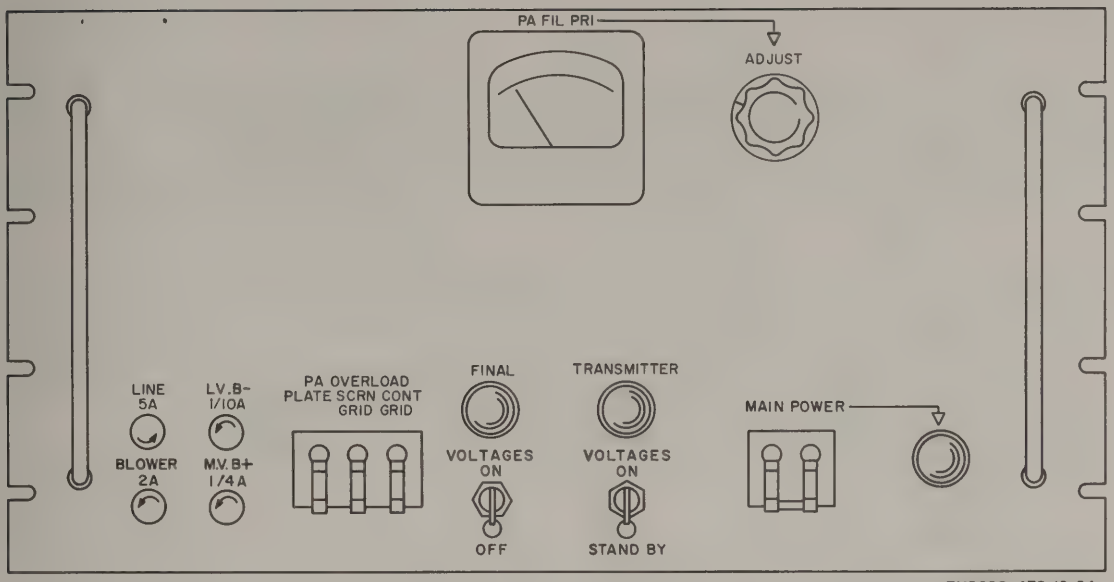


Figure 14. PP-2765A/URA-36, controls and indicators.

22. SB-1577/FRT (fig. 15)

Control or indicator	Function
UTILITY OUTLETS receptacles	Provide utility power.
MAIN POWER pilot lamp	When lighted, indicates that ac power to AN/FRT-56 is turned on.
MAIN POWER CIRCUIT breaker	Turns ac power on and off for all components of AN/FRT-56.
UTILITY POWER blown fuse indicators (2).	When lighted, indicates that associated UTILITY POWER fuse is blown.

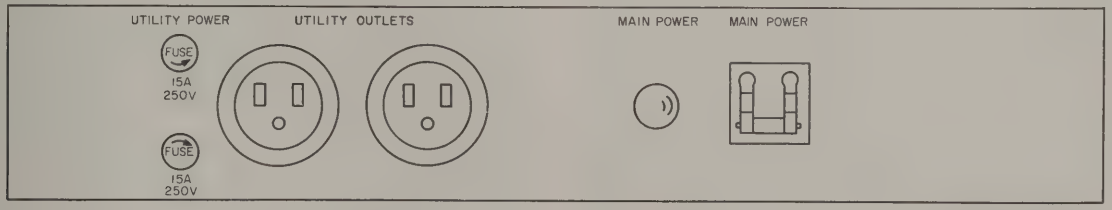


Figure 15. SB-1577/FRT, front panel control and indicators.

23. IM-166/URT (fig. 16)

Control or indicator	Function	
	Sw pos	*Action*
Selector switch.....	OFF	Turns meter off.
	X1	Selects low power range (100 watts maximum).
	X10	Selects high power range (1,000 watts maximum).
	Scale	*Indicates*
Meter	FORWARD-WATTS ...	Forward power in watts.

Control or jack	Function
	WATTS-REFLECTED. Reflected power in watts.
	VSWR ..... Voltage standing wave ratio.
Connector J304 (fig. 22).....	Connection for transmission line from transmitter..
Connector J305 (fig. 22).....	Connection for transmission line to antenna.

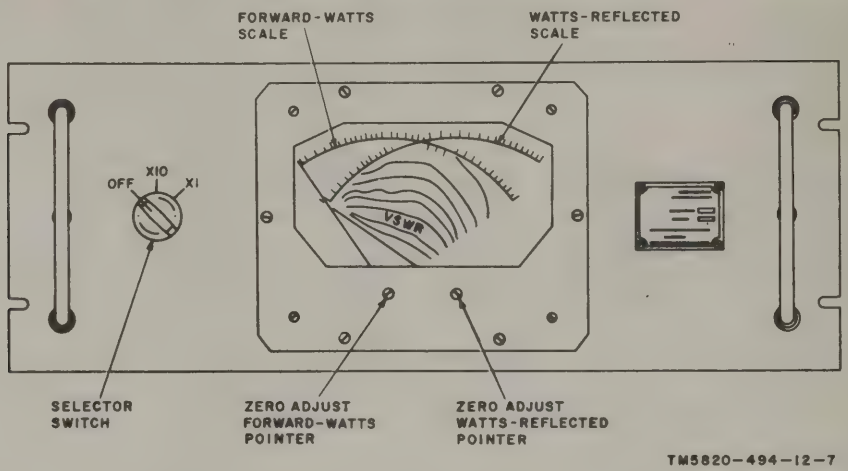


Figure 16. IM-166/URT, controls and indicator.

Section II. OPERATING INSTRUCTIONS

24. Types of Operation

Radio Transmitting Set AN/FRT-56, as supplied, *is not capable of independent operation.* However, the AN/FRT-56 may be tuned up, using the O-330B/FR as the excitation source to produce and uninterrupted continuous wavw (cw) output. When provided with additional equipment (para 7), the AN/FRT-56 may be used for all the operations described below. To operate the equipment, perform the starting procedures (*a* and *b* below) and then refer to the particular mode of operation desired:

a. Preliminary starting procedure (para 25).

b. Starting procedure (para 26).

c. O-330B/FR tuning procedure (para 27).

d. AM-2785A/URA-36 tuning procedure (para 28).

e. Sideband or amplitude-modulation (am) operation (para 29).

f. Teletypewriter operation (para 30).

g. Stopping procedure (para 31).

25. Preliminary Starting Procedure

To insure frequency stability, the O-330B/FR should be left on at all times (MAIN POWER circuit breaker at ON, and the POWER switch on the O-330B/FR subpanel turned to ON). If the AN/FRT-56 has been completely turned off when these procedures are started, in addition to the preliminary control settings listed below, the MAIN POWER circuit breaker on the SB-1577/FRT and the POWER switch on the O-330B/FR will be off.

Component	Control	Position
AM-2785A/URA-36.	ALDC switch (rear panel).	OFF.
PP-2765A/URA-36.	PA FIL PRI ADJUST switch.	Approximately one-quarter turn from fully counter-clockwise.
	FINAL VOLTAGES switch.	OFF.
	TRANSMITTER VOLTAGES switch.	STANDBY.
	MAIN POWER switch.	OFF
IM-166/URT	Selector switch....	OFF.

26. Starting Procedure

Notes:

1. If an abnormal indication is obtained during the starting procedure, refer to the operation checklist (para 35) for corrective measures. With the controls set as directed in paragraph 25, perform the following steps:

2. The calibration of the O-330B/FR (para 18) must be performed before the AN/FRT-56 is operated. Proceed to step 3 directly if the MAIN POWER circuit breaker on the SB-1577/FRT is on and the O-330B/FR has been on for 48 hours or longer. If not, perform steps 1 and 2, wait 48 hours, and proceed to step 3.

Step	Component	Control or switch	Action	Indication
1	SB-1577/FRT	MAIN POWER circuit breaker.	Set to ON	MAIN POWER lamp on the SB-1577/FRT lights and the blowers in the cabinet goes on.
2	O-330B/FR	POWER and HFO switches.	Set to ON	MAIN POWER, INNER OVEN, and OUTER OVEN lamps light. (When the O-330B/FR ovens reach their normal operating temperatures, the INNER OVEN and OUTER OVEN lamps will cycle on for 5 seconds and off for 90 seconds.)
3	PP-2765A/URA-36 ..	MAIN POWER circuit breaker.	Set to ON	MAIN POWER lamp lights and the blowers in the AM-2785A/URA-36 and the PP-2766/URA-36 go on.
4	PP-2765A/URA-36 ..	PA FIL PRI ADJUST switch.	Adjust for 115-volt indication on PA FIL PRI meter.	PA FIL PRI meter indicates 115 volts.

27. Tuning Procedure, O-330B/FR

Note: The O-330B/FR requires an initial warmup period of at least 48 hours. Normally, the unit should not be turned off unless detailed repairs become necessary. The O-330B/FR provides one output voltage from the HFO section (available at connectors J208, J209, J210 (fig. 13)). Other outputs are available from the O-330B/FR for use when additional equipment is used with the AN/FRT-56. Refer to TM 11-5820-277-12 for operation of the O-330B/FR with other equipments.

a. Tuning Procedure, Using Vmo (fig. 12 and 13).

(1) Connect J208, J209, or J210 to J201 on the AM-2785A/URA-36.

(2) Set the BEAT switch to ON.

(3) Plug the headset into the PHONES jack.

(4) Set the BAND-MCS switch to the desired band.

(5) Set the XTAL switch to VMO.

(6) Tune the MASTER OSCILLATOR FREQUENCY control to the checkout frequency ((7) below) closest to the desired frequency dial reading. To obtain the frequency dial reading, the desired operating frequency must be divided by 2 for the 4-8-mc band, by 4 for the 8-16-mc band, by 8 for the 16-32-mc band, and by 16 for the 32-64-mc band. The frequency dial reading already reads the correct operating frequency for the 2-4-mc band. Note the direction of rotation used in approaching the checkout frequency. As an example, for operation at 32.445 mc, the desired dial reading is 2,027,811 (32,445,000 ÷ 16). Use checkpoint 2,028,571 in the list below.

(7) In this list of checkout frequencies, the two left-hand digits of the dial reading (these digits range from 20 to 40) are omitted. The listed last 5 digits hold true for any frequency from 2.0 to 4.0 mc.

-,-00,000	-,-50,000
-,-05,000	-,-55,000
-,-10,000	-,-60,000
-,-12,500	-.-66,667
-,-20,000	-,-71,428
-,-25,000	-,-75,000
-,-28,571	-,-80,000
-,-30,000	-,-83,333
-,-33,333	-,-85,714
-,-40,000	-,-90,000
-,-45,000	-,-95,000

(8) Vary the CALIBRATE control for

a zero beat. At exactly 100-kc increments, the ZERO BEAT indicator lamp should go out; near zero beat, the lamp will flicker on and off. At 50-kc increments a zero-beat indication will be obtained from the headset. When the CALIBRATE control is set on the zero-beat point use the LOCK knob to lock it in place.

(9) Tune the MASTER OSCILLATOR FREQUENCY control to the desired operating frequency dial reading.

Note: For accurate calibration and resettability, rotate the MASTER OSCILLATOR FREQUENCY control in the same direction as in (6) above to prevent any error due to backlash in the gears.

(10) Set the BEAT switch to the off (down) position.
(11) Turn the METER switch to HFO.
(12) Set the HFO switch to ON.
(13) Set the TUNING control to the position numerically closest to the MASTER OSCILLATOR FREQUENCY dial reading.
(14) Vary the OUTPUT control to obtain a one-quarter scale (approximately) reading on the meter.
(15) Adjust the TUNING control for the highest meter reading obtainable.
(16) Adjust the OUTPUT control until an rf output level of 1.5 volts is indicated on the meter.

b. Tuning Procedure, Using Crystals.

(1) Connect J208, J209, or J210 to J201 on the AM-2785A/URA-36.
(2) Set the HFO switch to ON.
(3) Set the METER switch to HFO.
(4) Turn the XTAL switch to 1, 2, or 3 to select the desired crystal. (Crystals in use are noted on inside of access door.)
(5) Turn the BAND-MCS switch to the proper band (*a*(6) above).
(6) Set the TUNING control to the position numerically closest to the crystal frequency being used.
(7) Use the XTAL FREQ trimmer to set exact frequency.
(8) Adjust the OUTPUT control for a slight reading on the meter.
(9) Adjust the TUNING control for the highest meter reading obtainable.
(10) Adjust the OUTPUT control until an rf output of 1.5 volts is indicated on the meter.

28. Tuning Procedure, AM-2785A/URA-36

Note: When an external exciter is used, the tuning procedures for the exciter *must* be completed before this procedure is performed.

When the starting procedure has been performed (para 25 and 26) and the rf input (para 27) is applied to input jack J201, operate the AM-2785A/URA-36 and the associated power supplies as follows:

a. Set the PA BAND and DRIVER BAND switches on the AM-2785A/URA-36 for the frequency range into which the input signal frequency falls. For example, if the input signal is 26.8 mc, the PA BAND and DRIVER BAND switches should be set to 22-32.

b. Set the MULTI METER switch on the AM-2785A/URA-36 to PA DC BIAS. The MULTI METER meter should indicate approximately -100 volts dc.

c. Set the TRANSMITTER VOLTAGES switch on the PP-2765A/URA-36 to ON. The TRANSMITTER VOLTAGES lamp should light.

d. Set the MULTI METER switch on the AM-2785A/URA-36 to RF 1ST AMPL PLATE.

e. Rotate the 1ST AMPL TUNING control on the AM-2785A/URA-36 until a peak indication is obtained on the MULTI METER meter. Adjust the OUTPUT control on the O-330B/FR for an indication of 7 on the MULTI METER meter.

f. Set the MULTI METER switch to RF PA GRID. Adjust the PA GRID TUNING control until a peak indication is obtained on the MULTI METER meter.

Note: The tuning charts will vary for each AN/FRT-56. The readings on these charts were prepared with the AN/FRT-56 connected to a dummy load. These readings will differ from those obtained when the equipment is in actual use.

g. Set the PA TUNING control to the setting shown in the tuning chart supplied with the AN/FRT-56.

h. Set the PA LOADING switch to the setting shown in the tuning chart supplied with the AN/FRT-56.

i. Rotate the PA LOADING control to

the setting shown in the tuning chart supplied with the AN/FRT-56.

j. Set the FINAL VOLTAGES switch on the PP-2765A/URA-36 to ON. The FINAL VOLTAGES pilot lamp should light.

k. Slowly increase the setting of the OUTPUT control until the reading on the PA PLATE CURRENT meter is approximately 220 milliamperes.

l. Adjust the PA TUNING control until a pronounced dip is produced on the PA PLATE CURRENT meter.

m. Adjust the setting of the PA LOADING control until the reading on the PA PLATE CURRENT meter rises.

n. Set the MULTI METER switch to RF OUT and note the level of rf output.

o. Repeat the procedure given in *l* through *n* above to increase the excitation until the desired power output is obtained.

Note: Full-rated power output will be obtained with approximately 400 to 450 milliamperes of plate current.

Caution: **If the AN/FRT-56 turns off automatically as a result of a temporary pa overload, reduce the external equipment input to the AM-2785A/URA-36 before turning on the associated circuit breaker.**

p. Set the selector switch on the IM-166/URT to X10.

29. Sideband or Am. Operation

Single, double, or independent sideband (ssb, dsb, or isb) and am. operation may be obtained when Oscillator, Radio Frequency O-672A/URA-28 and Power Supply PP-1769/URA-23 are used with the AN/FRT-56. This modulating equipment is part of Radio Transmitting Set AN/FRT-53A, and installation and operation is covered in detail in TM 11-5820-472-12. Refer to paragraphs 36 through 40 in TM 11-5820-472-12 for sideband and am. operation of this equipment.

30. Teletypewriter Operation

When teletypewriter operation is desired, Exciter Unit O-5C/FR must be connected to the O-330B/FR through the SB-1577/FRT. Refer to paragraph 15 for connection details. Refer to TM 11-2205B for operation instructions on the O-5C/FR. Refer to paragraphs 27 and 28 to operate the AN/FRT-56 as a cw transmitter keyed by a teletypewriter input.

31. Stopping Procedure

The AN/FRT-56 may be placed in standby or completely turned off. For standby, or when the offtime of the AN/FRT-56 will not exceed 48 hours, the O-330B/FR should be left on to maintain maximum stability. The normal stopping procedure for the AN/FRT-56 takes at least 5 minutes. In an emergency, the entire AN/FRT-56 may be stopped immediately.

a. Standby. To place the AN/FRT-56 in standby operation, set the switches indicated in the chart below to the positions listed in the chart.

Component	Switch	Position
PP-2766/URA-36	FINAL VOLTAGES	OFF
	TRANSMITTER VOLTAGES	STANDBY

b. Normal Stopping. The normal stopping procedure for the AN/FRT-56 is listed in the chart below. Do not turn off the O-330B/FR unless the AN/FRT-56 is to remain off for more than 48 hours.

Caution: **Wait at least 5 minutes from the time the FINAL VOLTAGES switch and the TRANSMITTER VOLTAGES switch are turned off before turning off the MAIN POWER circuit breaker. This delay will leave the blower on and gradually cool the pa tube in the AM-2785A/URA-36.**

Component	Control	Position
PP-2765A/URA-36.	FINAL VOLTAGES switch	OFF
	TRANSMITTER VOLTAGES switch.	STANDBY
Low-voltage power supply.	MAIN POWER circuit breaker.	OFF
O-330B/FR..	POWER switch	Off[a]
SB-1577/FRT	MAIN POWER circuit breaker.	Off[a]

[a] Turn off only if the transmitter offtime will exceed 48 hours.

c. Emergency Stopping. To turn off the AN/FRT-56 in an emergency, set the MAIN POWER circuit breaker on the SB-1577/FRT to OFF.

CHAPTER 4
MAINTENANCE INSTRUCTIONS

Section I. OPERATOR'S MAINTENANCE

32. Scope of Operator's Maintenance

The following maintenance duties are normally performed by the operator of the AN/FRT-56. These procedures do not require special tools or test equipment.

a. Preventive maintenance (para 33).
b. Visual inspection (para 34).
c. Operational checks (para 35).
d. Replacement of pilot lamps and fuses (para 36).

33. Operator's Preventive Maintenance

Perform the preventive maintenance procedures given in the following chart:

Item	Maintenance procedure
1	Check completeness and general condition of equipment (appx II).
2	Remove dust, dirt, moisture, and grease from the front panel controls, and component panels. If necessary, wet the cloth with Cleaning Compound (Federal stock No. 7930-395-9542) and wipe the parts; then wipe with a clean dry cloth.
3	Check to see that all controls work smoothly, are tight on the shaft, and do not bind.
4	Check for normal operation; use the operational checklist (para 35).
5	Use a clean cloth to remove dust and dirt from the cabinet. Turn off power before cleaning near the antenna connector.
6	Inspect components for rust.
7	Inspect external cables and cords for cuts and broken insulation.
8	Check for loose external cable connectors.
9	Clean the meter windows with a clean dry cloth.

Warning: **Cleaning compound is flammable and its fumes are toxic. Do not use near a flame; provide adequate ventilation.**

34. Operator's Visual Inspection

a. When the equipment fails to perform properly, turn off the power and check all the items listed below.

Caution: **Do not check any item with the power on.**

(1) Improper settings of switches and controls (para 19 through 23).
(2) Interlock switch open because component in the cabinet is not properly seated.
(3) Burned-out fuses (usually indicates some other fault).

Caution: **Do not replace a fuse with one of a higher rating. If a fuse burns out immediately after replacement, DO NOT replace it again. Troubleshooting at higher echelon is necessary.**

b. If the above checks do not locate the trouble, proceed to the operational checklist (para 35).

35. Operational Checklist

a. General. The operational checklist consists of preliminary starting and operating procedures and is supplemented by the operator's repair procedures (para 36). The corrective measures listed are those the operator can perform. When no corrective measures are listed or if the measures suggested do not restore normal equipment performance, troubleshooting is required by higher echelon personnel. Note on the repair tag what corrective measures were taken, and how the equipment performed at the time of failure.

b. Procedure. To check the operation of the AN/FRT-56, set the front-panel controls as indicated in paragraph 26 and perform the steps listed below. Do not proceed with later steps until abnormal condition is corrected.

Note: When input power is applied to the AN/FRT-56 (MAIN POWER lamp on the SB-1577/FRT

is lighted), the O-330B/FR is on (MAIN POWER lamp on O-330B/FR is ghted), and OUTER OVEN and INNER OVEN pilot lamps on the O-330B/FR are cycling on and off normally, proceed directly to step 4. If the MAIN POWER pilot lamp and both the OUTER OVEN and INNER OVEN pilot lamps on the O-330B/FR are off, proceed with step 1.

c. Checklist.

Action	Normal indication	Corrective measure
1. Turn on MAIN POWER circuit breaker on SB-1577/FRT.	MAIN POWER lamp on SB-1577/FRT panel lights and blower fans go on.	Check to see that power is applied from the station's power distribution system. Check MAIN POWER lamp.
2. Turn POWER switch on O-330B/FR to ON.	MAIN POWER lamp on O-330B/FR lights. OUTER OVEN and INNER OVEN lamps light.	Check MAIN POWER lamp. Check OUTER OVEN and INNER OVEN lamps.
3. Determine vmo frequency required for operation at the desired output frequency. Tune O-330B/FR to this frequency (para 27).	Meter on O-330B/FR indicates 1.5 volts.	
4. Set MAIN POWER circuit breaker on PP-2765A/URA-36 to ON.	MAIN POWER lamp lights. Blower in AM-278A/URA-36 goes on. Blower in PP-2766/URA-36 goes on.	Check MAIN POWER lamp. Check LINE fuse. Check BLOWER fuse. See that door interlock on PP-2766/URA-36 is closed.
5. Set the MULTI METER switch on the AM-2785A/URA-36 to PA DC BIAS.	MULTI METER meter indicates -100 volts dc.	
6. After at least 3 minutes, turn TRANSMITTER VOLTAGES switch to ON.	TRANSMITTER VOLTAGES lamp lights.	Check TRANSMITTER VOLTAGES lamp. Check L. V. B- and M. V. B+ fuses. Check to see that access door on front panel of PP-2766/URA-36 is firmly closed and that top and bottom covers of the AM-2785A/URA-36 are securely in place.
7. Tune driver stages of the AM-2785A/URA-36 (para 28*a* through *i*).		
8. Set FINAL VOLTAGES switch on PP-2765A/URA-36 to ON.	FINAL VOLTAGES lamp on PP-2765A/URA-36 lights.	Check to see that PA OVERLOAD PLATE and PA OVERLOAD SCRN GRID circuit breakers are on. Reset if necessary. If circuit breakers go off again, higher echelon repair is required. Check FINAL VOLTAGES lamp.
9. Tune final power amplifier (para 28*j* through o).	Full-rated output is obtained at desired frequency.	

36. Operator's Repairs

a. Replacement of Pilot Lamps.

(1) Turn the glass pilot lamp jewel counterclockwise and pull it out to expose the pilot lamp.

(2) Press in on the lamp and turn it counterclockwise to unlock.

(3) Remove the lamp and replace it with a new one. Push the new lamp in and twist it clockwise to lock.

(4) Replace the glass pilot lamp jewel and turn it clockwise to lock.

b. Replacement of Fuses.

(1) Press in on the fuseholder cap and turn it counterclockwise to unlock.

(2) Remove the fuseholder cap.

(3) Remove the fuse from the fuseholder and replace it with a spare fuse.

Caution: **Always replace a fuse with one of identical value. The equipment may become damaged by the use of an improper fuse.**

(4) Replace the fuseholder cap and turn it clockwise to lock.

Section II. ORGANIZATIONAL MAINTENANCE

Note: The organizational maintenance procedures in this section are intended for second echelon personnel at a fixed station installation. Maintenance procedures for second echelon personnel, not operating in a fixed station are limited to procedures that require no test equipment.

37. Scope of Organizational Maintenance

Organizational maintenance of the AN/FRT-56 consists of the following:

a. Organizational preventive maintenance (para 39).

b. Organizational maintenance visual inspection (para 40).

c. Equipment performance checks (para 41).

d. Replacement of components (para 42 and 43).

e. Replacement of tubes (para 44).

f. Replacement of crystals (para 45).

38. Test Equipment, Tools, and Materials Required

a. Test Equipment and Tools.

(1) Audio Oscillator TS-382A/U.
(2) Test Set, Electron Tube TV-7/U.
(3) Multimeter ME-26B/U.
(4) Tool Kit TK-87/U.

b. Materials.

(1) Cleaning compound.
(2) Cleaning cloth.
(3) Sandpaper, #000.
(4) Rubber tape.
(5) Friction tape.
(6) Lubricating oil, general purpose (LO) (FSN 9150-252-6173).

39. Organizational Preventive Maintenance

Perform the preventive maintenance procedures given in the following chart:

Item	Maintenance procedures
1	Check the completeness and general condition of the equipment.
2	Remove dust, dirt, moisture, and grease from the front-panel controls and component panels. If necessary, wet the cloth with Cleaning compound and wipe the parts; then wipe with a clean dry cloth.
3	Check to see that all controls work smoothly, are tight on the shaft, and do not bind.
4	Check for normal operation; use the operational checklist (para 35).
5	Use a clean cloth to remove dust and dirt from the cabinet. Turn off power before cleaning near the antenna connector.
6	Inspect rack-mounted components for rust.
7	Inspect external cables and cords for cuts and broken insulation. Repair any cuts in the external cable insulation by covering them with rubber tape and then with friction tape. Repair or replace broken cables.
8	Check for loose external cable connections.
9	Clean the meter windows with a clean dry cloth.
10	Inspect tubes, crystals, and relays to be sure they are firmly seated.
11	Inspect relays and circuit breakers for loose mountings, bad contacts, misalignment of contacts and springs, and proper spring tension.
12	Inspect variable capacitors for dirt and misalignment of plates.
13	Inspect resistors for blistering and discoloration. Inspect insulators for cracks and chipping.
14	Remove and clean air filters (para 43).
15	Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on the bare metal to protect it from further corrosion. Refer to applicable cleaning and refinishing practices specified in TM 9-2851.

Warning: **Cleaning compound is flammable and its fumes are toxic. Do not use near a flame; provide adequate ventilation.**

40. Organizational Maintenance Visual Inspection

Before performing the procedures given in the equipment performance checklist (para 41), the organizational repairman should visually inspect the AN/FRT-56. In addition to the items listed in paragraph 34, inspect the following for obvious defects:

Caution: **Do not inspect any item with the power on.**

a. Disconnected plugs or cables between units of the AN/FRT-56.

b. Interlock switch connections.

c. Terminal board connections.

d. Chassis wiring and parts (for burned insulation).

41. Equipment Performance Checklist

a. General. The equipment performance checklist is a procedure used to systematically check equipment performance. All corrective measures which organizational repairmen can perform are given in the *Corrective measure* column. All pilot lamps and all fuses (except the OVENS and POWER fuses on the rear panel of the O-330B/FR are assumed to have been checked by the operator and are *not* listed in the *Corrective measures* column of this checklist. When using the checklist, follow each step in the order given. If the corrective measures indicated do not restore normal performance, or no corrective measures are given, troubleshooting is required by higher echelon. Note on the repair tag how the equipment performed and what corrective measures were taken.

Note: When the main power input circuit to the AN/FRT-56 is on (MAIN POWER lamp on the SB-1577/FRT is on) and the O-330B/FR OVEN lamps are cycling normally, proceed directly to step 9 to avoid turning off the oven heater in the O-330B/FR. If the MAIN POWER lamp and the OVEN lamps on the O-330B/FR are off, begin with step 1.

b. Checklist.

Note: Refer to figures 17 through 21 for tube and crystal locations.

	Step	Unit	Action	Normal indication	Corrective measures
PREPARATORY	1	PP-2765A/URA-36....	Set FINAL VOLTAGES switch to OFF. Set TRANSMITTER VOLTAGES switch to STAND BY. Set MAIN POWER circuit breaker to off position.		
	2	External exciter (if used).	Refer to manual covering external equipment for control settings.		
	3	O-330B/FR	Set HFO, IFO, and BFO switches to their off positions. Set POWER switch to its off position. Set BAND-MCS switch to the desired operating band (set to the 2-4 mc position if operating with external sideband exciter). Plug a headset into PHONES jack.		
	4	SB-1577/FRT	Set MAIN POWER circuit breaker to off position.		
	5	AM-2785A/URA-36 ...	Set ALDC control fully counterclockwise.		
		Rf output assembly....	Connect suitable antenna or dummy load to J609 (fig. 3) on the rf output assembly.		
	6	All components.....	Check to see that all units are securely mounted within the cabinet and that all component covers or doors are closed.		

	Step	Unit	Action	Normal indication	Corrective measures
EQUIPMENT PERFORMANCE	7	SB-1577/FRT	Set MAIN POWER circuit breaker to on position.	MAIN POWER lamp lights.	Check cable connections between primary power source and SB-1577/FRT.
				Cabinet blower fans operate.	Check seating of plug P603 (fig. 5).
	8	O-330B/FR	Set POWER switch to ON.	MAIN POWER pilot lamp lights.	Check O-330B/FR power connection to J613 (fig. 5) on the ac power strip.
				After several hours, OUTER OVEN pilot lamp blinks on for approximately 5 seconds and off for approximately 30 seconds.	Check OVENS fuse.
				After several hours, INNER OVEN pilot lamp blinks on for approximately 90 seconds and off for approximately 90 seconds.	Check OVENS fuse.
	9	O-330B/FR	Set HFO switch to ON. Turn METER switch to HFO. Turn XTAL switch to VMO. Set OUTPUT control to midposition.	Meter indicates rf output level.	Check tubes V101, V102, V202 through V207, V301, and V302.
	10	O-330B/FR	Turn BEAT switch to ON. Turn HFO switch to ON. Turn XTAL switch to VMO. Turn MASTER OSCILLATOR FREQUENCY dial through entire frequency range.	Headset indicates zero beat at many intervals throughout frequency range. ZERO BEAT pilot lamp lights at all times except at many of the zero-beat intervals.	Check headset. Check tubes V103 and V104.
	11	O-330B/FR	Turn MASTER OSCILLATOR FREQUENCY dial to 2,000 KCS (000) CPS reading. Adjust CALIBRATE o control for zero beat.	Headset, and possibly ZERO BEAT pilot lamp, indicates zero beat when proper calibration is reached.	
	12	O-330B/FR	Turn MASTER OSCILLATOR FREQUENCY dial to 2,500 KCS, to 3,000 KCS, to 3,500 KCS, and then to 4,000 KCS. Adjust CALIBRATE control at each frequency setting listed above, but *do not* make more than 2 complete revolutions of the CALIBRATE control from its position at 2,000 KCS to effect calibration at any dial frequency. Upon completion of this step, tune O-330B/FR to obtain the desired operating frequency (para 27).	Headset, and possibly ZERO BEAT pilot lamp, indicates zero beat within the limits of adjustment of CALIBRATE control.	Calibrate the O-330B/FR (para 18).
	13	PP-2765A/URA-36 ...	Set PA OVERLOAD circuit breakers (PLATE SCRN GRID, and CONT GRID) to on position.		

	Step	Unit	Action	Normal indication	Corrective measures
EQUIPMENT PERFORMANCE			Set MAIN POWER circuit breaker to on position.	MAIN POWER pilot lamp lights.	
				PA FIL PRI meter indicates 115 volts ac.	Set PA FIL PRI ADJUST switch to position that produces 115 volts ac on meter.
				Blower motor B201 in AM-2785A/URA-36 and blower motor B401 in PP-2766/URA-36 go on.	Check to see that door interlock on PP-2766/URA-36 front panel is secure.
	14	AM-2785A/URA-36 ...	Set MULTI METER switch to PA DC BIAS.	MULTI METER meter indicates -100 volts dc.	If no reading is obtained, check to see that PA OVERLOAD CONT GRID circuit breaker on PP-2765A/URA-36 is on. If trouble persists, check bias rectifier V701.
	15	PP-2765A/URA-36 ...	Set TRANSMITTER VOLTAGES switch to ON.	TRANSMITTER VOLTAGES lamp lights after 3 minutes have elapsed from time MAIN POWER circuit breaker was placed in its own position.	Check tubes V704 through V708.
	16	AM-2785A/URA-36 ...	Set MULTI METER switch to RF 1ST AMPL PLATE; tune 1ST AMPL TUNING control (para 28*d* and *e*).	A peak reading is obtained at operating frequency.	Check rf amplifier V201.
	17	AM-2785A/URA-36 ...	Set MULTI METER switch to RF PA GRID; tune PA GRID TUNING control (para 28*f*).	A peak reading is obtained at operating frequency.	Check driver tube V202.
	18	AM-2785A/URA-36 ...	Set PA TUNING and PA LOADING controls and PA LOADING switch to settings in tuning chart (supplied with equipment) which correspond to operating frequency.		
	19	PP-2765A/URA-36...	Set MULTI METER switch to RF PA PLATE; set FINAL VOLTAGES switch to ON.	FINAL VOLTAGES lamp lights.	
				Reading appears on the MULTI METER meter.	Check to see that all cover interlocks are closed.
					Check to see that cables are secure between J401 on PP-2766/URA-36 and J202 on AM-2785A/URA-36, and between J302 on the PP-2765A/URA and the PP-2766/URA-36.
					Check rectifiers V401 and V402.
	20	AM-2785A/URA-36 ...	Increase excitation to the input of the AM-2785A/URA-36.	PA PLATE CURRENT meter indicates 300 milliamperes.	Check power amplifier V203.
	21	AM-2785A/URA-36 ...	Tune PA TUNING control.	A pronounced dip is detected at operating frequency.	

	Step	Unit	Action	Normal indication	Corrective measures
	22	AM-2785A/URA-36 ...	Adjust setting of PA LOADING control.	PA PLATE CURRENT meter indicates an increase in current.	
	23	AM-2785A/URA-36 ...	With MULTI METER switch set to RF OUT, adjust OUTPUT control on O-33OB/FR (or output control on external exciter equipment) for desired rf output reading on MULTI METER.		
	24	IM-166/URT	Set selector switch to X10.	The standing wave ratio should be approximately 1.5:1.	When standing wave ratio exceeds 3:1, retune the AN/FRT-56. Check antenna system.
STOP	25	PP-2765A/URA-36....	Set FINAL VOLTAGES switch to OFF. PA PLATE CURRENT meter on AM-2785A/URA-36 reads zero.	FINAL VOLTAGES lamp goes out.	
	26	PP-2765A/URA-36....	Set TRANSMITTER VOLTAGES switch to STANDBY. *Note:* Wait 5 minutes before proceeding with remaining steps.	FINAL VOLTAGES lamp goes out. MULTI METER on reads zero (in any position of MULTI METER switch).	
	27	PP-2765A/URA-36....	Set MAIN POWER circuits breaker to off position.	MAIN POWER lamp goes out. PA FIL PRI meter reads zero. Blower motor B201 and blower motor B401 supply go off.	
	28	O-33OB/FR.....	Set HFO switch in off position.	Meter reads zero. *Note:* If AN/FRT-56 is to be turned on again within 48 hours, do not disturb remaining power controls. If AN/FRT-56 will be off for any extended period greater than 48 hours or if repairs of O-33OB/FR are necessary, proceed with following steps.	
			Set POWER switch to off position.	MAIN POWER lamp goes out. INNER OVEN and OUTER OVEN lamps stay out.	
	29	SB-1577/FR	Set MAIN POWER circuit breaker to off position.	MAIN POWER lamp goes out. Cabinet blower fans go off.	

42. Removal and Replacement of Components

The various components of the AN/FRT-56 are either slide-mounted or panel-mounted. Procedures for removing and replacing these components are given in *a*, *b*, and *c* below.

a. Panel-Mounted Components.

(1) On the front panel of the component, remove the screws that secure the component to the cabinet.

(2) Slide the component out of the cabinet until the cable connections at the rear are accessible.

(3) Tag and disconnect all cables and

wires connected to the jacks and terminal boards of the component being replaced.

(4) Remove the component.

(5) Set the replacement component in position in the cabinet.

(6) Connect all cables and wires.

(7) Push the component into the cabinet; be sure that the cables do not kink or bind.

(8) Replace the screws that secure the component to the cabinet.

b. Slide-Mounted Components (fig. 9).

***Warning:* Two men should replace heavy components such as the O-330B/FR and the power supplies.**

(1) Remove the screws that secure the component to the front of the cabinet.

(2) Pull the component out of the cabinet until the release buttons on the chassis slides engage the holes in the tracks.

(3) Tag and disconnect all cables and wires connected to the rear of the component being replaced.

(4) Press the release buttons and slide the component off the tracks.

(5) Set the replacement component in position on the tracks.

Note: It may be necessary to hold the tracks in the extended position while positioning the component.

(6) Slide the component on the tracks until the release buttons catch.

(7) Press the release buttons and push the component into the cabinet until the release buttons engage the holes in the tracks.

(8) Make all cable and wire connections at the rear of the component.

(9) Press the release buttons and push the component into the cabinet; be sure the cables do not kink or bind.

(10) Replace the screws that secure the component to the cabinet.

c. Tilting Slide-Mounted Components (fig. 9). To tilt the component to reach the top or bottom of the chassis:

(1) Remove the screws that secure the component to the cabinet.

(2) Pull the component out of the cabinet until the release buttons engage the hole in the tracks.

(3) Pull out the tilt lever and tilt the component to the desired position.

(4) Pull out the tilt lever to return the component to the horizontal position.

(5) Press the release buttons and slide the component into the cabinet; be sure that the cables do not kink or bind.

(6) Secure the component to the cabinets.

43. Removal, Replacement, and Cleaning of Air Filters

a. Removal and Replacement of Air Filter in PP-2766/URA-36. To remove the air filter, open the access plate on the front of the component and slide the air filter up through the opening in the air filter frame. To replace the air filter, insert the filter in the frame and then lock the access plate.

b. Removal and Replacement of Air Filter in AM-2785A/URA-36. To remove the air filter, remove the screw and air filter holding bracket from the top of the rear panel of the component and slide the air filter up through the opening in the air filter frame. To replace the air filter, insert the filter in the air filter frame and secure the air filter holding bracket in position with the screw.

c. Removal and Replacement of Cabinet Rear Door Air Filter. This air filter may be removed without opening the cabinet rear door. To remove the air filter from the rear door of the cabinet, slide the filter up through the opening in the air filter frame. To replace the air filter, insert the filter in the frame and push downward.

d. Cleaning Air Filters. Remove the air filters (*a*, *b*, and *c* above) and clean as follows:

(1) Use blowers to blow out dust.

(2) Pour cleaning compound over the filter. Place a large basin under the filter to catch the compound. After the dirt particles settle, the clear compound can be reused.

(3) Use a light water spray to flush out loosened dirt.

(4) After the filter is dry, spray oil

(LO) *very sparingly* on the side of the filter that faces the flow or air. To prevent oil from being spread throughout the equipment by air suction, *avoid using excess oil.*

44. Tube Removal and Replacement

Warning: **Turn off all power before attempting tube replacement.**

To reach the tubes in the various components of the AN/FRT-56, follow the directions given in paragraph 42. Most of the tubes are easily replaceable. Certain tubes require special procedures for removal and replacement. These procedures are detailed in *a*, *b*, and *c* below.

a. Replacing Tube V203 in AM-2785A/URA-36 (fig. 17).

(1) Slide the AM-2785A/URA-36 chassis out of the cabinet and remove the top cover plate.
(2) Loosen the tube clamp screw on V203.
(3) Swing the tube clamp over the top of the tube and remove the tube.
(4) Seat the replacement tube in the tube socket and place the tube clamp over the tube.
(5) Tighten the tube clamp screw.
(6) Replace the top cover plate and slide the AM-2785A/URA-36 back into the cabinet.

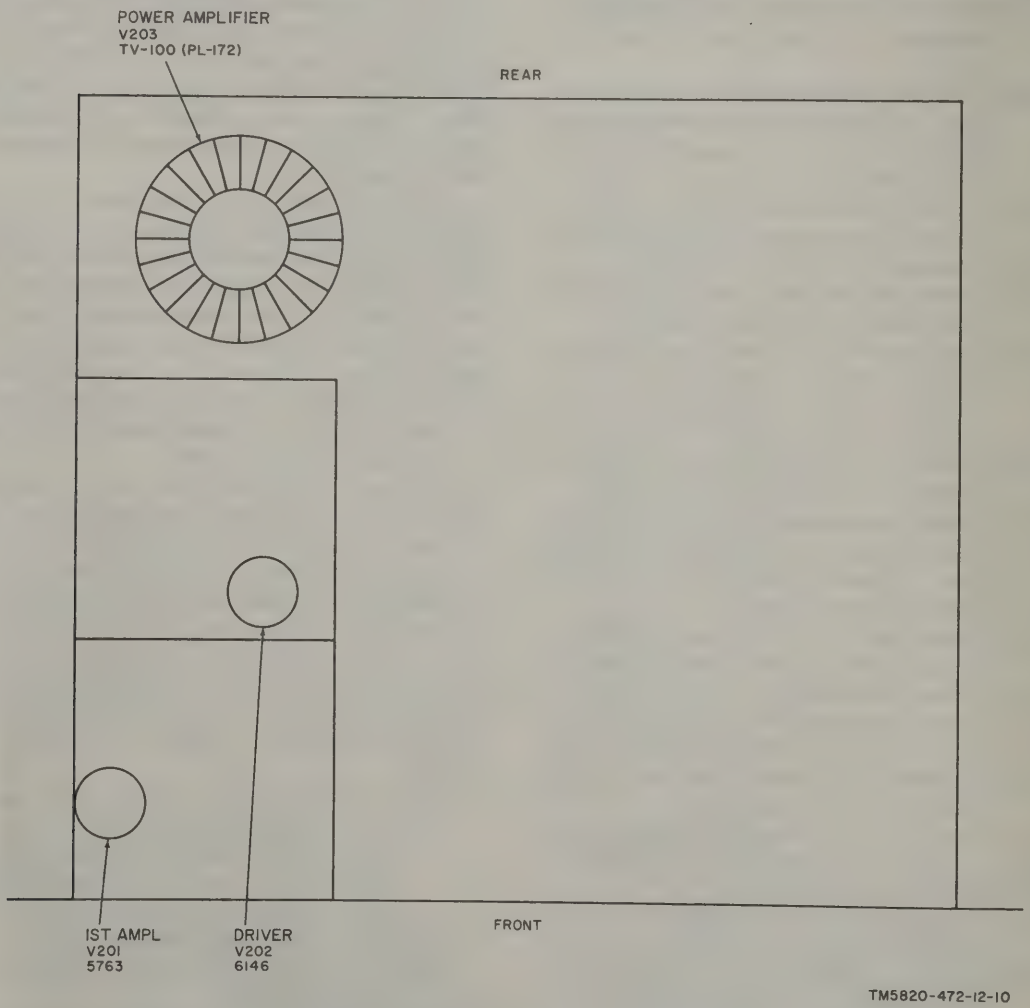


Figure 17. AM-2785/URA-36, tube location.

b. Replacing V401 or V402 in PP-2766/URA-36 (fig. 17).

Warning: **Before proceeding, allow enough time for the tubes to cool.**

(1) Slide the PP-2766/URA-36 out of the cabinet and remove the top cover plate.

(2) Remove the Phillips screw that holds the bracket over the tubes, and remove the bracket.

(3) Remove the connection to the top plate cap of the tube being replaced, and remove the tube.

(4) Seat the replacement tube in the tube socket, and replace the connections to the top plate cap.

(5) Replace the bracket over the tubes and secure it with the Phillips screw.

(6) Replace the top cover plate and slide the PP-2766/URA-36 back into the cabinet.

c. Replacing V201 Through V207 in O-330B/FR (fig. 21).

(1) Slide the O-330B/FR out of the equipment rack and remove the top cover plate.

(2) To reach the V200 series tubes, removal of the O-330B/FR power supply chassis is necessary. Disconnect the following plugs:

(a) Plug P301 from jack J101.

(b) Plug P101 from jack J201.

(c) Plug P102 from jack J203.

(3) Loosen the four 1/4-turn fasteners (two on the front panel and two under the rear of the power supply chassis).

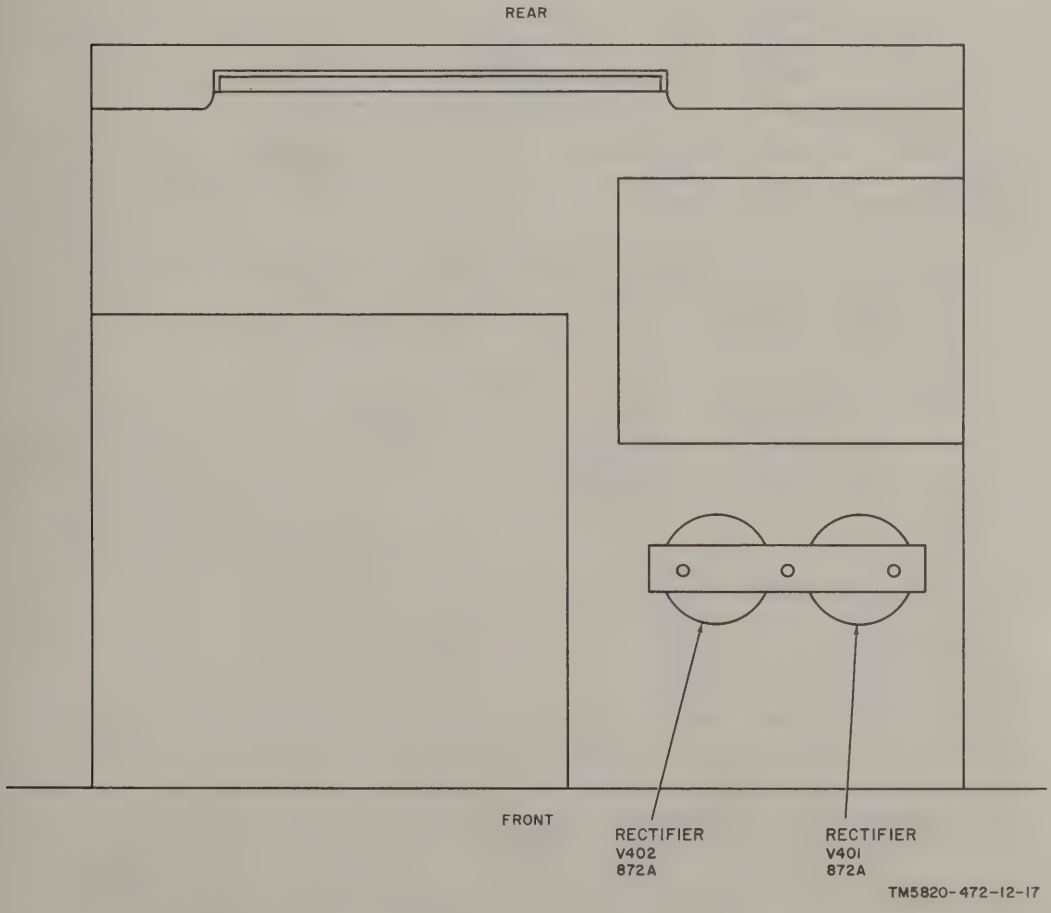


Figure 18. PP-2766/URA-36, tube location.

(4) Remove the power supply chassis from the O-330B/FR by sliding the chassis to the rear.
(5) Replace a defective tube with a known good tube. Be sure to replace the tube shield.
(6) Replace the power supply chassis in the O-330B/FR by sliding the chassis to the front.
(7) Tighten the four 1/4-turn fasteners.
(8) Mate the plugs and jacks ((2) above).
(9) Replace the top cover plate and slide the O-330B/FR back into the cabinet.

45. Removal and Replacement of Crystals

Crystals are contained in the O-330B/FR. Removal and replacement procedures for these crystals are as follows:

Note: Crystal Y301, in the variable master oscillator oven, is not replaced at this echelon.

a. To reach the Y200 series crystals, refer to the procedure for the V200 series tube access (para 44).

b. Push aside the crystal-holding spring to remove the Y100 or Y200 series crystals.

c. Pull up the crystal holders to remove them from the socket.

d. Insert the replacement crystal firmly into the socket, and replace the crystal-holding spring. Replace the power supply chassis (para 44 *c* (6) through (9)).

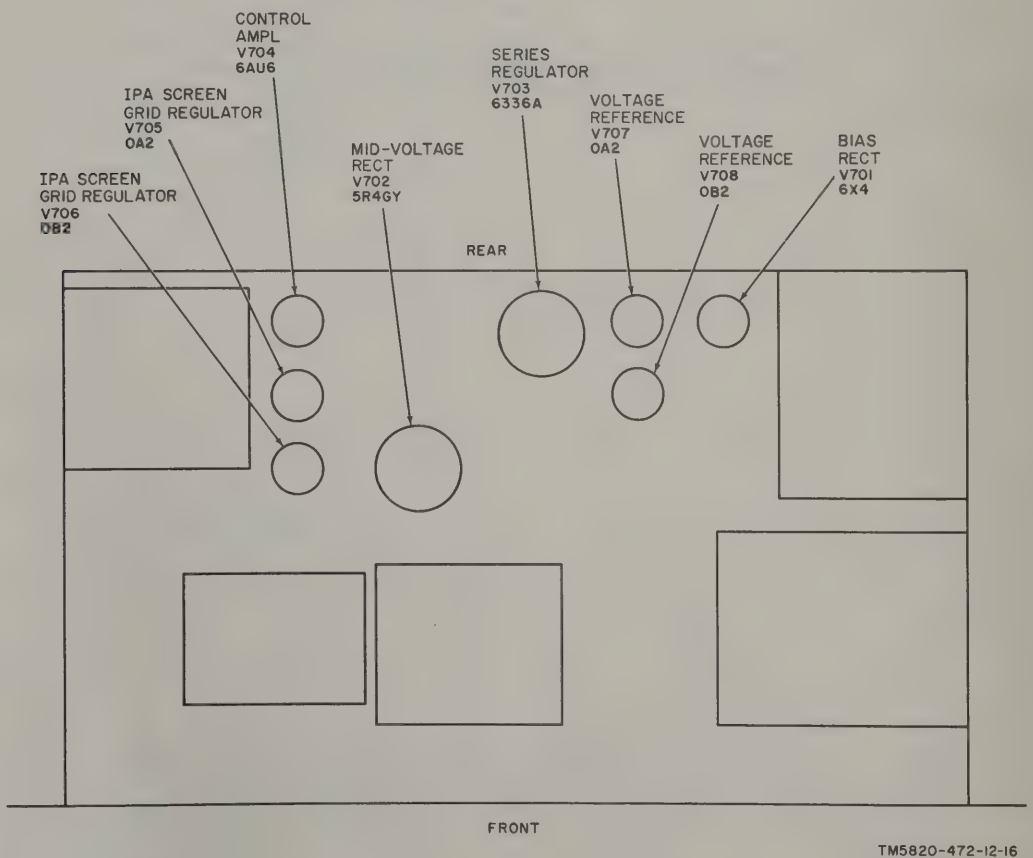


Figure 19. PP-2765A/URA-36, tube location.

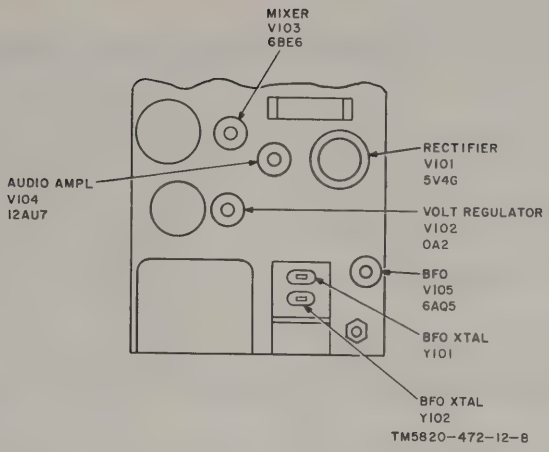


Figure 20. O-330B/FR, variable frequency oscillator, top view.

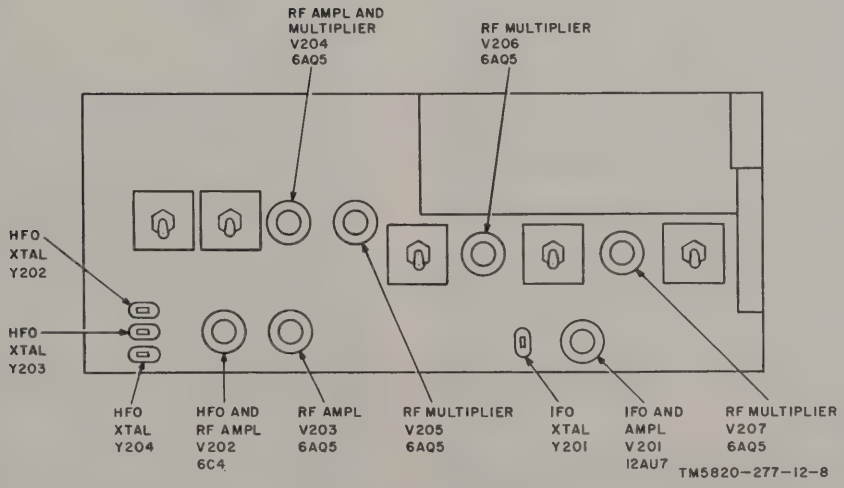


Figure 21. O-330B/FR, rf multiplier chassis, top view.

CHAPTER 5

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

46. Disassembly

The AN/FRT-56 is normally shipped with all components (except the SB-1577/FRT) removed from the cabinet. Use the procedure detailed below to disassemble the equipment.

Warning: **Be sure that all power is turned off.**

a. Removing Interunit Connections.

(1) Remove the power input connections on the rear panel of the SB-1577/FRT.

(2) Remove all connections between external equipment and terminal strips at the rear of the SB-1577/FRT.

(3) Disconnect cables from J606 and J609 of the rf output assembly.

(4) Refer to figure 22 and remove all interunit cables.

b. Component Removal. Follow the instructions given in paragraph 42 to remove all the panel-mounted and slide-mounted components. Coil all loose cables and place them on top of the components associated with the cables.

c. Handling, Storage, and Disposal of Radioactive Material. Follow the procedures for safe handling, storage, and disposal of radioactive materials as directed by:

(1) TB SIG 225, Identification and Handling of Radioactive Signal Items.

(2) AR 40-580, Medical Service, Control of Hazards Health from Radioactive Materials.

(3) AR 755-380, Disposal of Supplies and Equipment, Disposal of Unwanted Radioactive Material.

47. Repacking Equipment for Shipment or Limited Storage

a. Material Requirements. The exact procedure for repacking depends on the material available and the conditions under which the equipment is to be stored or shipped. Use the procedures outlined below whenever circumstances permit. A separate box is required for each component. The following list gives the packing personnel an indication of the materials necessary. For stock numbers of materials, refer to SB 38-100.

Material	Quantity
Wooden box (O-330B/FR)	16 x 22 x 25 in.
Wooden box (AM-2785A/URA-36)	15 x 24 x 25 in.
Wooden box (PP-2765A/URA-36)	17 x 18 x 25 in.
Wooden box (PP-2766/URA-36)	22 x 23 x 25 in.
Wooden box (IM-166/URT)	13 x 21 x 25 in.
Waterproof-vaporproof barrier material.	210 sq ft
Waterproof tape	100 ft
Corrugated cardboard	180 sq ft
Adhesive tape	80 ft
Filler material	50 lb
Flat steel strapping	225 ft
Desiccant bags (each component)	4
Humidity indicators (each component)	2
Cushioning material (each component).	2 cu ft
Steel strap locks	24

b. CY-3703/FRT-56. When the cabinet is to be shipped a short distance or stored for a short time, it may be moved without crating. However, if it is necessary to package the cabinet, a crate should be constructed. Obtain a wooden skid (27 by 28 inches) and set a sheet of waterproof-vaporproof barrier material, a sheet of corrugated paper, and another sheet of moisture-vaporproof barrier material on top of the skid. The sheets should be approximately 26 by 27 inches. Set the cabinet on top of the skid and cover with moisture-vaporproof barrier material and corrugated cardboard. Use waterproof tape to secure all edges. Construct a crate over the cabinet; use three steel bands to secure the crate. Set wooden blocks within

the crate to position the cabinet securely. The quantities of materials listed in a above does not include the material needed to crate the cabinet. The overall dimensions of the cabinet are 72-1/2 by 20-5/8 by 22-1/2 inches.

c. *Packaging.*

(1) Cushion each component on all surfaces with pads of filler material. Place the cushioned equipment within a wrap of corrugated cardboard. Secure the wrap with adhesive tape.

(2) Tie the coiled cables in three places. Wrap the spare parts in corrugated cardobard and secure with adhesive tape.

(3) Line the inside of each wooden box with waterproof-vaporproof barrier material.

(4) Place the packaged components inside the lined boxes. Also place the technical manuals and the spare parts within the lined wooden boxes. Fill excess space in the boxes with pads of corrugated cardboard and filler material. Sesure the waterproof-vaporproof barrier material with waterproof tape.

(5) Nail the covers on the boxes and apply three bands of metal strapping around each box.

Section II. DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

48. Authority for Demolition

The demolition procedures given in paragraph 50 will be used to prevent the enemy from using or salvaging this equipment. Demolition of the equipment will be accomplished only upon the order of the commander.

49. Destruction Plan

If a destruction plan is not provided by higher authority, one should be prepared by the organization using the equipment. In this plan, personnel should be assigned specific destruction tasks, but all personnel in the using organization should be familiar with all aspects of the complete destruction plan. The plan must be adequate and easily carried out in the field and must provide for as complete a destruction as available time, equipment, and personnel will permit. Because the time required for complete destruction may not always be available, the destruction plan must establish priorities so that essential parts of the equipment will be destroyed in the order of their importance. Systematic destruction of the same important units of equipment of a given type will prevent the enemy from learning the important features of the equipment or assemblying a complete equipment by cannibalization of partially destroyed equipments. Adequate destruction of some units of the equipment should always be accomplished in preference to partial destruction of all units. Which of the methods of destruction listed in paragraph 50 is to be used depends on the time available for destruction.

50. Methods of Destruction

The following information is for guidance only. Some of the procedures outlined require the use of explosives and incendiary grenades which normally may not be authorized items for the AN/FRT-56. The issue of these and related materiels, and the conditions under which destruction will be effected, are command decisions in each case, according to the tactical situation.

Method	Requirements
Mechanical	Ax, pick, mattock, sledge, crowbar or similar implement.
Burning	Gasoline, oil, incendiary grenades, or other flammables.
Demolition	Suitable explosives or ammunition.

Note: Prior to performing destruction by any of the following methods, mechanically smash all front panel meters and indicators.

a. *Demolition.*

(1) Plan for simultaneous detonation, and prepare charges of explosive,

TNT (using 1-pound blocks or equivalent) together with the necessary detonating cord to make up each charge, as indicated below:

(2)

Charge	*Location of charge*
1 pound	Open cover of the AM-2785A/URA-36, and place the charge next to the tuning mechanism.
1 pound	Place charge on right side of O-330B/FR (above the variable master oscillator oven).
1 pound	Place 1-pound charges within each of the remaining components.

(3) Connect these charges for simultaneous detonation with detonating cord. Provide for dual priming to minimize the possibility of a misfire. For priming, either a nonelectric blasting cap crimped to at least 5 feet of safety fuse (safety fuse burns at the rate of 1 foot in 30 to 45 seconds; test before using), or an electric blasting cap and firing wire may be used. Safety fuse, which contains black powder, and nonelectric blasting caps must be protected from moisture at all times. The safety fuse is ignited by a fuselight or match before personnel take cover. The electric blasting cap requires a blasting machine or equivalent source of electricity and is fired after personnel takes cover.

Warning: **Keep the blasting caps, detonating cord, and safety fuse separated from the charges until required for use.**

Notes:

1. For the successful execution of methods of destruction involving the use of demolition materials, all personnel concerned will become thoroughly familiar with the pertinent provisions of FM 5-25. Training and careful planning are essential. The danger area is approximately 300 yards.

2. If time and means are not available to carry out the above demolition procedure, place a hand grenade in the cabinet the access door on the front of the PP-2766/URA-36. Smash items not demolished by the grenade, as time permits.

b. Burning. See that instruction manuals and the equipment tuning charts are burned, regardless of other methods of destruction used for other components of the equipment.

(1) Pile burnable materials, such as wood, rags, and sections of the cable system, on and under the materiel.

(2) Pour gasoline and oil in and over all components of the AN/FRT-56. From a safe distance, ignite the materiel by means of incendiary grenade, flamethrower, or other suitable means.

Warning: **When igniting the gasline, consideration should be given to the highly flammable nature of gasoline and its vapors. Carelessness in its use may result in painful burns.**

c. Disposal. Burn or scatter the destroyed parts in slit trenches, foxholes, or other holes, or throw them into streams.

APPENDIX I

REFERENCES

Following is a list of applicable references available to the operator and second echelon repairman of Radio Transmitting Set AN/FRT-56:

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.
FM 5-25	Explosives and Demolition.
SB 38-100	Preservation, Packaging, and Packing Materials, Supplies, and Equipment Used by the Army.
TB SIG 225	Radioactive Electron Tube Handling.
TM 9-2851	Painting Instructions for Field Use.
TM 11-2205B	Exciter Unit O-5C/FR and Radio Frequency Oscillator O-5D/FR.
TM 11-5821-277-12	Operator and Organizational Maintenance Manual: Oscillators, Radio Frequency O-330A/FR and O-330B/FR.
TM 11-5820-472-12	Operator and Organizational Maintenance Manual: Radio Transmitting Set AN/FRT-53.
TM 11-6625-200-12	Operator and Organizational Maintenance: Multimeters, Meter ME-26A/U and ME-26B/U.
TM 11-6625-261-12	Operator's and Organizational Maintenance Manual: Audio Oscillator TS-382A/U, TS-382B/U, TS-382D/U, TS-382E/U, and TS-382F/U.
TM 11-6625-274-12	Operator's and Organizational Maintenance Manual: Test Sets, Electron Tube TV-7/U, TV-7A/U, TV-7B/U, and TV-7D/U.
TM 38-750	The Army Equipment Record System and Procedures.

APPENDIX II
MAINTENANCE ALLOCATION

Section I. INTRODUCTION

1. General

a. This appendix assigns maintenance functions to be performed on components, assemblies, and subassemblies by the lowest appropriate maintenance echelon.

b. Columns in the maintenance allocation chart are as follows:

(1) *Part or component.* This column shows only the nomenclature or standard item name. Additional descriptive data are included only where clarification is necessary to identify the component. Components, assemblies, and subassemblies are listed in top-down order. That is, the assemblies which are part of a component are listed immediately below that component, and the subassemblies which are part of an assembly are listed immediately below that assembly. Each generation breakdown (components, assemblies, or subassemblies) is listed in disassembly order or alphabetical order.

(2) *Maintenance function.* This column indicates the various maintenance functions allocated to the echelons.

(a) Service. To clean, to preserve, and to replenish lubricants.

(b) Adjust. To regulate periodically to prevent malfunction.

(c) Inspect. To verify serviceability and to detect incipient electrical or mechanical failure by scrutiny.

(d) Test. To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc.

(e) Replace. To substitute serviceable components, assemblies, or subassemblies, for unserviceable components, assemblies, or subassemblies.

(f) Repair. To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes but is not limited to welding, grinding, riveting, straightening, and replacement of parts other than the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

(g) Align. To adjust two or more components of an electrical system so that their functions are properly synchronized.

(h) Calibrate. To determine, check, or rectify the graduation of an instrument, weapon, or weapons system, or components of a weapons system.

(i) Overhaul. To restore an item to *completely serviceable* condition as prescribed by serviceability standards developed and published by heads of technical services. This is accomplished through employment of the technique of "Inspect and Repair Only as Necessary" (IROAN). Maximum utilization of diagnostic and test equipment is combined with minimum disassembly of the item during the overhaul process.

(j) Rebuild. To restore an item to a standard as near as possible to original or new condition in appearance, performance, and life expectancy. This is accomplished through the maintenance technique of complete disassembly of the item, inspection of all parts or components, repair or

replacement of worn or unserviceable elements using original manufacturing tolerances and/or specifications and subsequent reassembly of the item.

(3) *1st, 2d, 3d, 4th, 5th echelons.* The symbol X indicates the echelon responsible for performing that particular maintenance operation, but does not necessarily indicate that repair parts will be stocked at that level. Echelons higher than the echelon marked by X are authorized to perform the indication operation.

(4) *Tools required.* This column indicates codes assigned to each individual tool equipment, test equipment, and maintenance equipment referenced. The grouping of codes in this column of the maintenance allocation chart indicates the tool, test, and maintenance equipment required to perform the maintenance function.

(5) *Remarks.* Entries in this column will be utilized when necessary to clarify any of the data cited in the preceding columns.

c. Columns in the allocation of tools for maintenance functions are as follows:

(1) *Tools required for maintenance functions.* This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

(2) *1st, 2d, 3d, 4th, 5th echelon.* The dagger (†) symbol indicates the echelons normally allocated the facility.

(3) *Tool code.* This column lists the tool code assigned.

2. Maintenance by Using Organizations

When this equipment is used by signal services organizations organic to theater headquarters or communication zones to provide theater communications, those maintenance functions allocated up to and including fourth echelon are authorized to the organization operating this equipment.

Section II. MAINTENANCE ALLOCATION CHART

(1) PART OR COMPONENT	(2) MAINTENANCE FUNCTION	(3) 1ST ECH	(4) 2ND ECH	(5) 3RD ECH.	(6) 4TH ECH.	(7) 5TH ECH.	(8) TOOLS REQUIRED	(9) REMARKS
TRANSMITTING SET, RADIO AN/FRT-56	service		X					
	adjust		X					
	inspect		X					Preventive Maintenance
	test		X					
	repair			X			2,3,7,8,9,10,11 12,13,15,16	
	align				X		1,2,4,5,6,7,8,9 10,12,15,16,17 18,19	
	overhaul					X	1,2,4,5,6,7,8,9 10,12,14,16,17 18,19	
AMPLIFIER POWER SUPPLY GROUP AN/URA-36A (TMC NO. PAL-1KA)	repair			X			2,3,7,8,9,10,11 12,13,15,16	
	overhaul				X		1,2,4,5,6,7,8,9 10,12,15,16,17 18,19	
AMPLIFIER, RADIO FREQUENCY AM-2785A/URA-36 (TMC NO. RFD-1A)	repair			X			2,3,7,8,9,10,11, 12,13,15,16	
	overhaul				X		1,2,4,5,6,7,8,9, 10,12,15,16,17, 18,19	

(1) PART OR COMPONENT	(2) MAINTENANCE FUNCTION	(3) 1ST ECH	(4) 2ND ECH	(5) 3RD ECH.	(6) 4TH ECH.	(7) 5TH ECH.	(8) TOOLS REQUIRED	(9) REMARKS
AN/FRT-56 (continued)								
POWER SUPPLY PP-2765A/URA-36 (TMC NO. PS-4A)	repair			X			8,9,10,15,16	
	overhaul				X		8,9,10,14,16,17, 18	
POWER SUPPLY PP-2766/URA-36 (TMC NO. PS-5)	repair			X			8,9,10,15,16	
	overhaul				X		8,9,10,14,16, 17,18	
CABINET, ELECTRICAL EQUIPMENT CY-3703/FRT-56 (TMC NO. RAK-9Q)	repair			X			8,9,10,16,17	
	overhaul				X		8,9,10,16,17,18	
INDICATOR, STANDING WAVE RATIO IM-166/URT (TMC NO. SWR-1K)	replace		X					See Separate MAC
	calibrate			X				At 3rd echelon calibrate at 1000 watts input. At 4th and 5th calibrate at 100 watts input.
	overhaul				X			
OSCILLATOR, RADIO FREQUENCY O-330B/FR (TMC NO. VOX-5)	replace		X					See Separate MAC
	overhaul				X			
PANEL, POWER DISTRIBUTION SB-1577/FRT (TMC NO. APP-4)	repair			X			8,9,10,16,17	
	overhaul				X		8,9,10,16,17,18	

Section III. ALLOCATION OF TOOLS FOR MAINTENANCE FUNCTIONS

(1) TOOLS REQUIRED FOR MAINTENANCE FUNCTIONS	(2) 1ST ECH.	(3) 2ND ECH.	(4) 3RD ECH.	(5) 4TH ECH.	(6) 5TH ECH.	(7) TOOL CODE	(8) REMARKS
AN/FRT-56 (continued)							
ANALYZER, SPECTRUM TS-723/U				†	†	1	
AUDIO OSCILLATOR TS-382/U			†	†	†	2	
FREQUENCY METER AN/URM-32			†			3	
FREQUENCY METER AN/URM-79				†	†	4	
FREQUENCY METER AN/URM-80				†	†	5	
FREQUENCY METER AN/USM-26				†	†	6	
HEADSET HS-33A			†	†	†	7	To be provided as Shop support.
MULTIMETER TS-352/U			†	†	†	8	
MULTIMETER, METER ME-26/U			†	†	†	9	
OSCILLOSCOPE OS-8/U			†	†	†	10	
POWER SUPPLY PP-1243/U			†			11	
RF SIGNAL GENERATOR AN/URM-25			†	†	†	12	
TEST SET AN/GRM-33			†			13	
TEST SET, ELECTRON TUBE TV-2/U					†	14	
TEST SET, ELECTRON TUBE TV-7/U			†	†		15	
TOOL KIT TK-87/U			†	†	†	16	
TOOL KIT TK-88/U				†	†	17	
VOLTMETER, METER ME-30/U				†	†	18	
DUMMY LOAD, ELECTRICAL DA-274/U			†	†	†	19	
NOTE: This is Fixed Plant Equipment.							

APPENDIX III

BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

1. General

This appendix lists items supplied for initial operation. The list includes tools, parts, and material issued as *part of* the major end item. The list includes all items authorized for basic operator maintenance of the equipment. End items of the equipment are issued on the basis of allowances prescribed in equipment authorization tables and other documents that are a basis for requisitioning.

2. Columns

a. Source, Maintenance, and Recoverability Code. Not used.

b. Federal Stock Number. This column lists the 11-digit Federal stock number.

c. Designation by Model. Not used.

d. Description. Nomenclature or the standard item name and brief identifying data for each item are listed in this column. When requisitioning, enter the nomenclature and description.

e. Unit of Issue. The unit of issue is each unless otherwise indicated and is the supply term by which the individual item is counted for procurement, storage, requisitioning, allowances, and issue purposes.

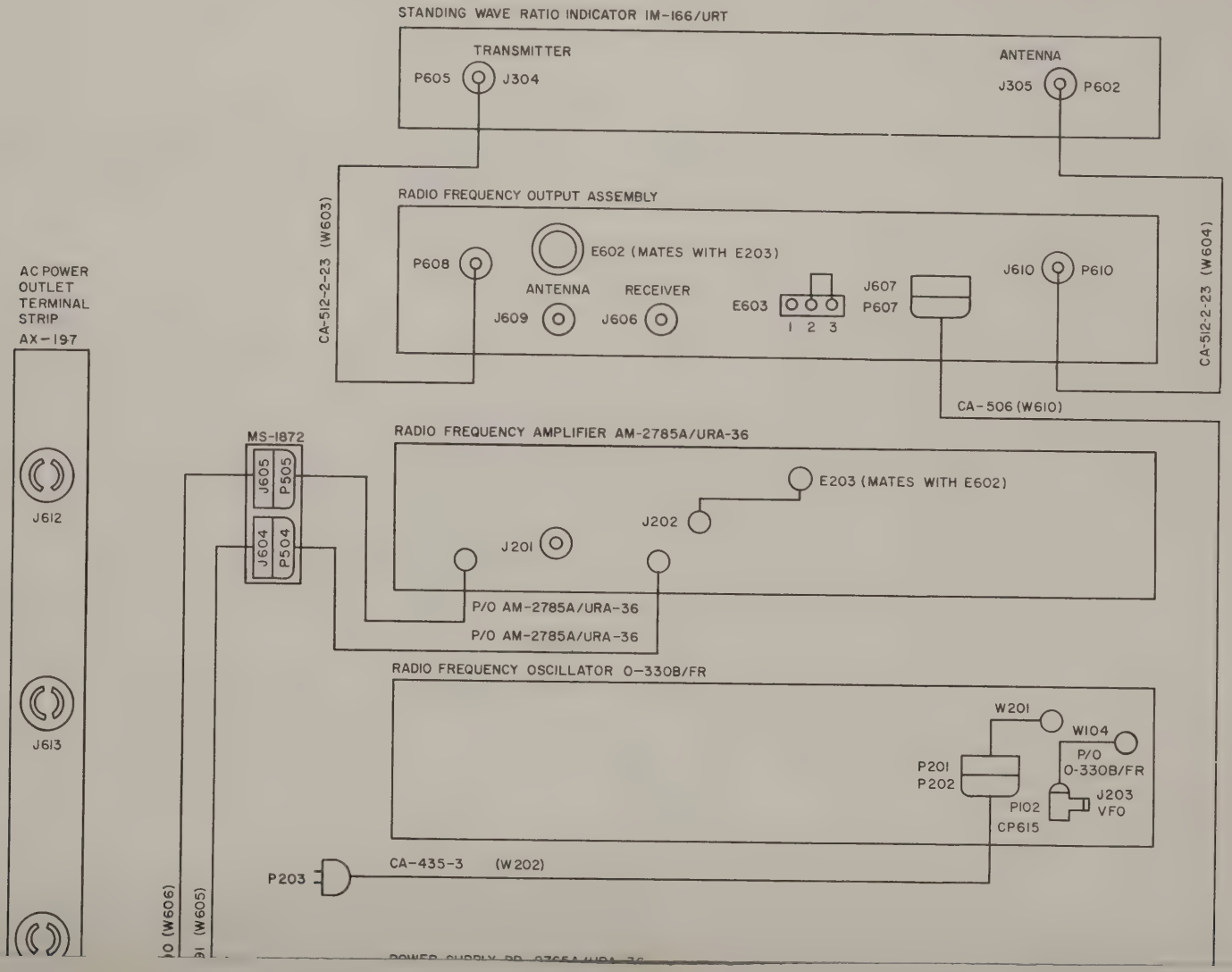
f. Expendability. Nonexpendable items are indicated by NX. Expendable items are not annotated.

g. Quantity Authorized. Under "Items Comprising an Operable Equipment", the column lists the quantity of items supplied for the initial operation of the equipment.

h. Illustrations. Not used.

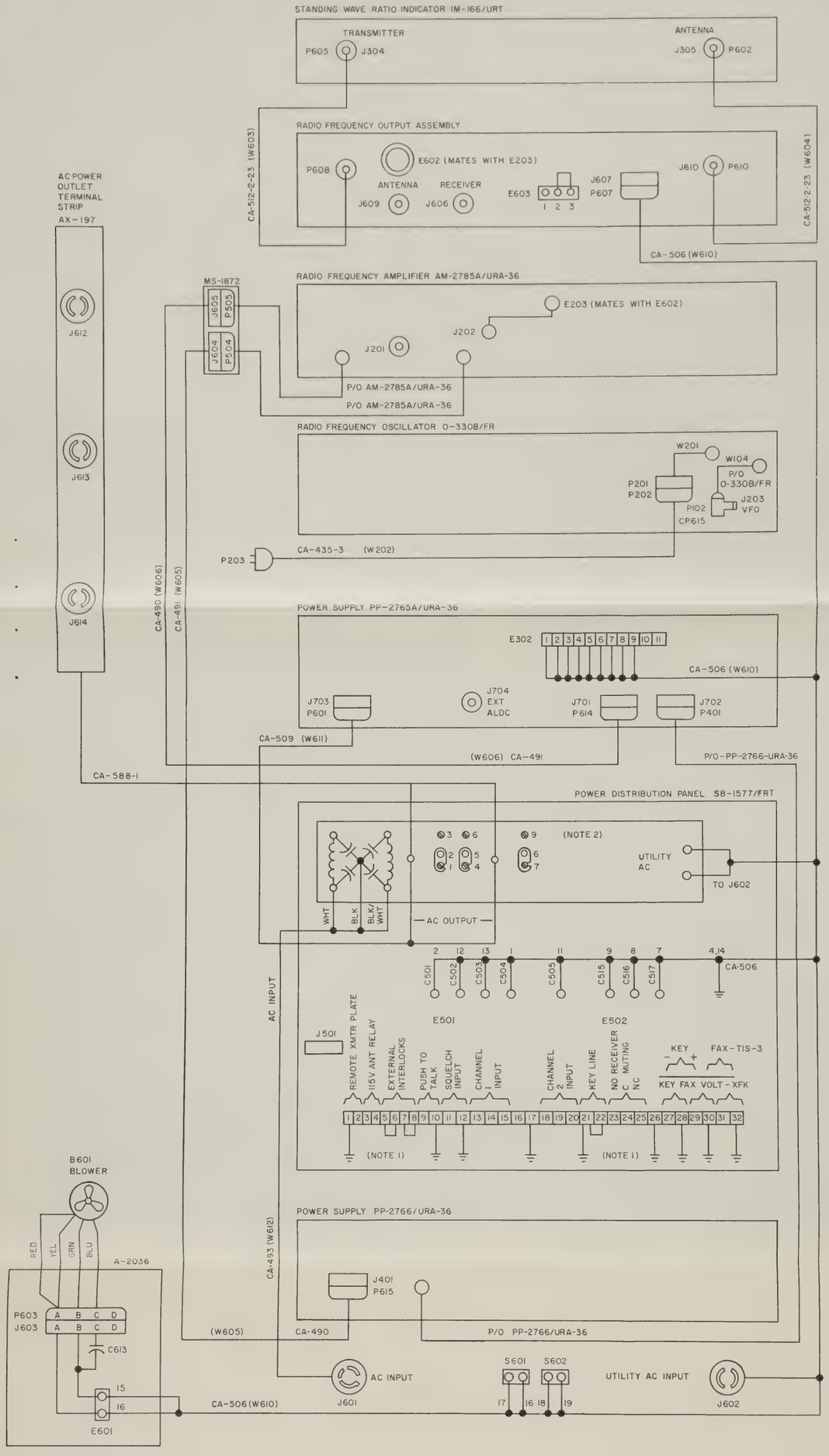
SECTION II. FUNCTIONAL PARTS LIST

(1) SOURCE MAINTENANCE AND RECOVERABILITY CODE	(2) FEDERAL STOCK NUMBER	(3) DESIGNATION BY MODEL	(4) DESCRIPTION	(5) UNIT OF ISSUE	(6) EXPENDABILITY	(7) QUANTITY AUTHORIZED	(8) ILLUSTRATIONS FIGURE NO.	(9) ILLUSTRATIONS ITEM NO
	5820-889-3849		TRANSMITTING SET, RADIO AN/FRT-56: 2 to 32 mc; 4 bands, 2 channels; TMC model SBT-1KQ		NX			
			ITEMS COMPRISING AN OPERABLE EQUIPMENT					
	Ord thru AGC		TECHNICAL MANUAL TM 11-5820-494-12			2		
	5820-892-3468		AMPLIFIER POWER SUPPLY GROUP AN/URA-36A: TMC model PAL-1KA; c/o Amplifier, RF AM-2785A/URA-36; Power Supply PP-2765A/URA-36; Power Supply PP-2766/URA-36		NX	1		
	5820-892-9061		CABINET, ELECTRICAL EQUIPMENT CY-3703/FRT-56: 75 in h x 20-5/8 in w x 22-1/2 in deep; houses components that make up the AN/FRT-56; TMC model RAK-9Q		NX	1		
	6625-889-1586		INDICATOR, STANDING WAVE RATIO IM-166/URT: TMC model SWR-1K(70); 20-1/2 in x 8-1/2 in h x 9-3/4 in deep		NX	1		
	6625-518-4661		OSCILLATOR, RADIO FREQUENCY O-330B/FR: 19 in x 16 in x 10-1/2 in o/a		NX	1		
	5820-804-1774		PANEL, POWER DISTRIBUTION SB-1577/FRT: TMC model APP-4; 19 in x 3-1/2 in h x 4 in d o/a		NX	1		
			RUNNING SPARE ITEMS					
			NO PARTS AUTHORIZED FOR STOCKAGE AT FIRST ECHELON					


STANDING WAVE RATIO INDICATOR IM-166/URT
TRANSMITTER
P605
J304
ANTENNA
J305
P602
RADIO FREQUENCY OUTPUT ASSEMBLY
P608
E602 (MATES WITH E203)
ANTENNA
J609
RECEIVER
J606
E603
1 2 3
J607
P607
J610
P610
CA-512-2-23 (W603)
CA-512-2-23 (W604)
CA-506 (W610)
AC POWER OUTLET TERMINAL STRIP AX-197
J612
J613
MS-1872
J605
P505
J604
P504
RADIO FREQUENCY AMPLIFIER AM-2785A/URA-36
E203 (MATES WITH E602)
J202
J201
P/O AM-2785A/URA-36
P/O AM-2785A/URA-36
RADIO FREQUENCY OSCILLATOR O-330B/FR
W201
W104
P/O O-330B/FR
P201
P202
P102
CP615
J203
VFO
P203
CA-435-3 (W202)
(W606)
(W605)

SECTION II. FUNCTIONAL PARTS LIST

(1) SOURCE MAINTENANCE AND RECOVERABILITY CODE	(2) FEDERAL STOCK NUMBER	(3) DESIGNATION BY MODEL	(4) DESCRIPTION	(5) UNIT OF ISSUE	(6) EXPENDABILITY	(7) QUANTITY AUTHORIZED	(8) ILLUSTRATIONS FIGURE NO	(9) ILLUSTRATIONS ITEM NO
	5820-889-3849		TRANSMITTING SET, RADIO AN/FRT-56: 2 to 32 mc; 4 bands, 2 channels; TMC model SBT-1KQ		NX			
			ITEMS COMPRISING AN OPERABLE EQUIPMENT					
	Ord thru AGC		TECHNICAL MANUAL TM 11-5820-494-12			2		
	5820-892-3468		AMPLIFIER POWER SUPPLY GROUP AN/URA-36A: TMC model PAL-1KA; c/o Amplifier, RF AM-2785A/URA-36; Power Supply PP-2765A/URA-36; Power Supply PP-2766/URA-36		NX	1		
	5820-892-9061		CABINET, ELECTRICAL EQUIPMENT CY-3703/FRT-56: 75 in h x 20-5/8 in w x 22-1/2 in deep; houses components that make up the AN/FRT-56; TMC model RAK-9Q		NX	1		
	6625-889-1586		INDICATOR, STANDING WAVE RATIO IM-166/URT: TMC model SWR-1K(70); 20-1/2 in x 8-1/2 in h x 9-3/4 in deep		NX	1		
	6625-518-4661		OSCILLATOR, RADIO FREQUENCY O-330B/FR: 19 in x 16 in x 10-1/2 in o/a		NX	1		
	5820-804-1774		PANEL, POWER DISTRIBUTION SB-1577/FRT: TMC model APP-4; 19 in x 3-1/2 in h x 4 in d o/a		NX	1		
			RUNNING SPARE ITEMS					
			NO PARTS AUTHORIZED FOR STOCKAGE AT FIRST ECHELON					

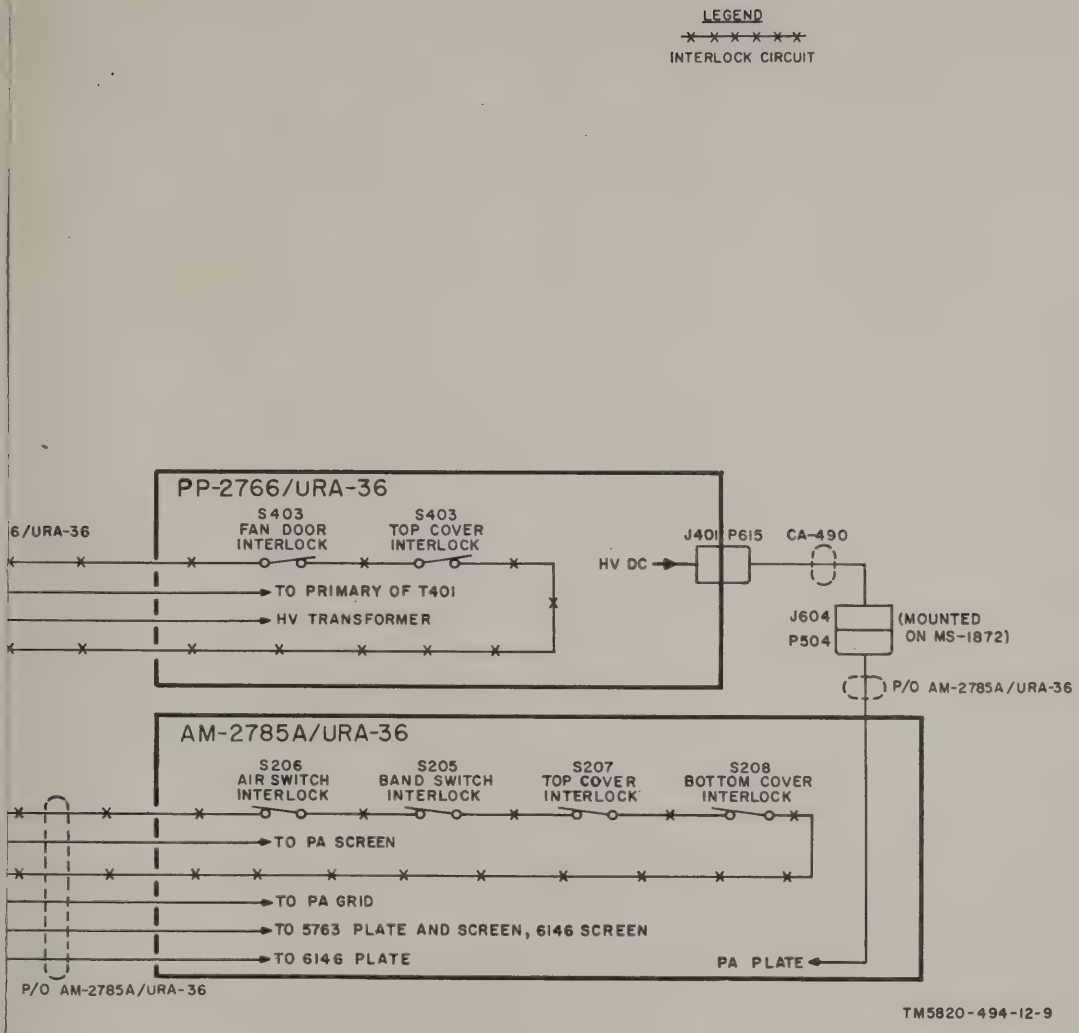


NOTES:

1. WHEN NOT USING EXTERNAL INTERLOCKS OR KEYING, CONNECT JUMPERS BETWEEN TERMINALS 5 AND 6, 7 AND 8, 21 AND 22 AS SHOWN
2. FOR 115V OPERATION CONNECT:
   1 AND 2, 4 AND 5, 7 AND 8
   FOR 230V OPERATION CONNECT:
   2 AND 3, 5 AND 6, 8 AND 9.

TM5820-494-12-8

Figure 22. AN/FRT-66, component installation interconnections.


LEGEND
INTERLOCK CIRCUIT
PP-2766/URA-36
6/URA-36
S403
FAN DOOR
INTERLOCK
S403
TOP COVER
INTERLOCK
TO PRIMARY OF T401
HV TRANSFORMER
HV DC
J401
P615
CA-490
J604
P504
(MOUNTED
ON MS-1872)
P/O AM-2785A/URA-36
AM-2785A/URA-36
S206
AIR SWITCH
INTERLOCK
S205
BAND SWITCH
INTERLOCK
S207
TOP COVER
INTERLOCK
S208
BOTTOM COVER
INTERLOCK
TO PA SCREEN
TO PA GRID
TO 5763 PLATE AND SCREEN, 6146 SCREEN
TO 6146 PLATE
PA PLATE
P/O AM-2785A/URA-36
TM5820-494-12-9

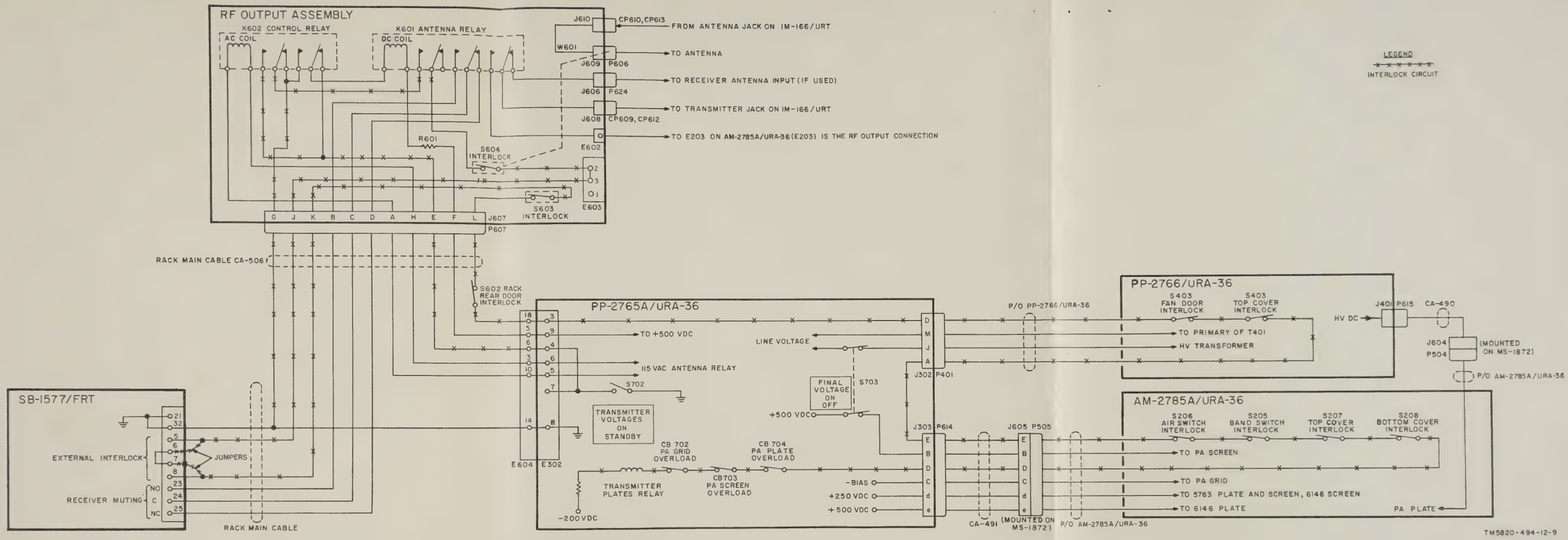


Figure 23. AN/FRT-56, interlock and relay interconnections.

By Order of Secretary of the Army:

EARLE G. WHEELER,
General, United States Army,
Chief of Staff.

Official:

J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

DASA (6)
USASA (2)
CNGB (1)
Cof Engrs (1)
TSG (1)
CSigO (5)
CofT (1)
USA CD Agcy (1)
USAATBD (1)
USCONARC (5)
ARADCOM (2)
ARADCOM Rgn (2)
OS Maj Comd (3)
OS Base Comd (2)
LOGCOMD (2)
MDW (1)
Armies (2)
Corps (2)
USA Corps (3)
USATC AD (2)
USATC Engr (2)
USATC Inf (2)
USATC FA (2)
USATC Armor (2)
Instl (2) except
Ft Monmouth (63)
USAOMC (4)
Svc Colleges (2)
Br Svc Sch (2)
GENDEP (OS) (2)
Army Dep (2) except
Sacramento (17)
Sig Sec, GENDEP (OS) (5)
Sig Dep (OS) (12)
USA Strat Comm Comd (4)
WRAMC (1)
USA Trans Tml Comd (1)
Army Tml (1)
POE (1)
OSA (1)
USAEPG (2)
AFIP (1)
AMS (1)
Army Pic Cen (2)
EMC (1)
USASSA (25)
USASSAMRO (1)
USARCARIB Sig Agcy (1)
USA Sig Msl Spt Agcy (13)
Sig Fld Maint Shops (3)
Def Log Svc Cen (1)
Units org under fol TOE
(2 cy ea UNOINDC)
11-7
11-16
11-57
11-98
11-117
11-155
11-157
11-500 (Tms AA-AE) (4)
11-557
11-587
11-592
11-597

NG: None.
USAR: None.
For explanation of abbreviations used see AR 320-50.